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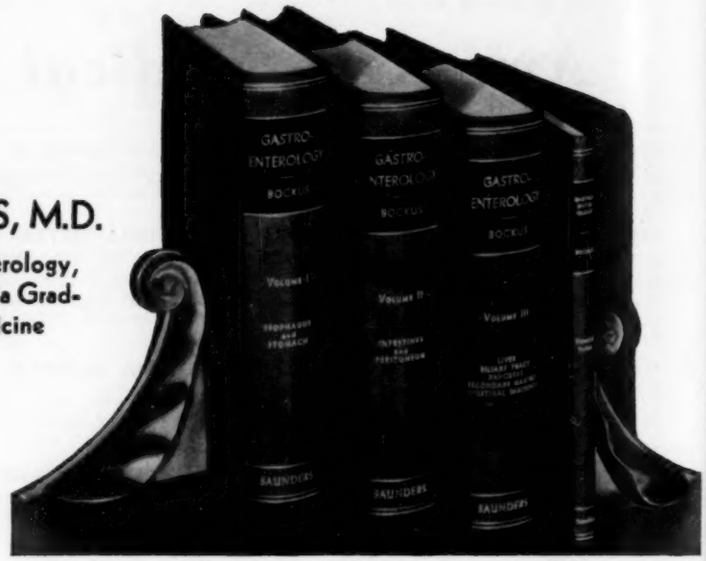

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THE ANOXIA TEST IN THE DIAGNOSIS OF CORONARY INSUFFICIENCY

A STUDY OF 289 CASES

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The diagnosis of coronary sclerosis is usually dependent on the clinical history of pain in the chest or arm, invoked by effort and relieved by rest. In certain cases an apparent constant correlation exists between the occurrence of pain and the amount of increased demand on the heart for work, but in many other cases the occurrence of pain is not related consistently to increased effort or other cause. Because of the vagaries of the symptom complex of angina pectoris, the diagnosis may be difficult to establish. Consequently, any objective method for confirming or excluding a diagnosis of coronary sclerosis would be of immediate interest to the clinician, particularly if the test was applicable from the standpoint of time and material, was harmless to the patient and could be definitely interpreted.

A number of observers have noted the reaction of so-called normal persons and of persons who have coronary disease to low percentages of oxygen, particularly in regard to electrocardiographic changes. The medical profession is indebted, however, to Levy and his associates [1] for their efforts to introduce a standardized test which might aid in the diagnosis of coronary sclerosis in difficult cases. Their continued studies, together with the work of Barach and others [2] and of Greene and Gilbert [3] have clarified many of the puzzling observations that originally were made in use of this procedure.

From the Division of Medicine, Mayo Clinic (Dr. Barnes).

1. Levy, R. L.; Barach, A. L., and Bruenn, H. G.: Effects of Induced Oxygen Want in Patients with Cardiac Pain, Am. Heart J. **15**: 187-200 (Feb.) 1938. Levy, Bruenn and Russell,[5] Levy, Williams, Bruenn and Carr,[6] Levy, Patterson, Clark and Bruenn.[6]

2. Barach, A. L.; Steiner, Alfred; Eckman, Morris, and Molomut, Norman: The Physiologic Action of Oxygen and Carbon Dioxide on the Coronary Circulation, as Shown by Blood Gas and Electrocardiographic Studies, Am. Heart J. **22**: 13-34 (July) 1941.

3. Greene, C. W., and Gilbert, N. C.: Studies on the Responses of the Circulation to Low Oxygen Tension: V. Stages in the Loss of Function of the Rhythm Producing and the Conducting Tissue of the Human Heart During Anoxemia, Am. J. Physiol. **56**: 475-486 (July) 1921; Studies on the Responses of the Circulation to Low Oxygen Tension: III. Changes in the Pacemaker and in Conduction During Extreme Oxygen Want as Shown in the Human Electrocardiogram, Arch. Int. Med. **27**: 517-557 (May) 1921; Studies on the Responses of the Circulation to Low Oxygen Tension: VI. The Cause of the Changes Observed in the Heart During Extreme Anoxemia, Am. J. Physiol. **60**: 155-192 (March) 1922.

In studies of the electrocardiographic effects of anoxia, Levy and his associates used a mixture containing oxygen 10 per cent and nitrogen 90 per cent. On the basis of their experience they defined certain criteria for the electrocardiographic changes associated with, and indicative of, coronary insufficiency. These they summarized as follows:[4] 1. The arithmetic sum of the RS-T deviations in all four leads (1, 2, 3 and 4F) is 3 mm. or more (fig. 1). 2. Partial or complete reversal of the direction of the T wave in lead 1 is accompanied by an RS-T deviation of 1 mm. or more. 3. Complete reversal of the direction of the T wave in lead 4F is present regardless of any associated RS-T deviation in this lead (figs. 2 and 3).

Moreover, they stated that "strong presumptive evidence of diminution in the coronary reserve is afforded by the occurrence of pain during a test which is electrocardiographically negative. The successful use of pain as an index will depend upon the observer's ability to differentiate it from the minor discomfort of an apprehensive subject, and his astuteness in detecting the occasional malingerer."

MATERIAL

At the Mayo Clinic during the last two and a half years the anoxia test has been performed in 300 cases. The present analysis is based on the results of the test in 289 of these cases. Evaluation of the patient's history and physical findings preceding the test disclosed symptoms or physical findings suggestive of coronary insufficiency in all but 7 cases. The clinical diagnosis was not established conclusively in any case prior to performance of the anoxia test.

The oldest patient was 67 years of age and the youngest was 24. Six patients were in the third decade of life, 57 in the fourth, 112 in the fifth, 94 in the sixth and 20 in the seventh.

The test never was performed in the presence of congestive heart failure or within four months after a suspected cardiac infarction or more than once in twenty-four hours in the same case.

METHOD

The method devised by Levy was used with only minor modifications. By means of a reservoir bag and a mask the patient breathed 10 per cent oxygen and 90 per cent nitrogen from a cylinder containing this mixture. A tank containing 100 per cent oxygen was included in the apparatus, and a flood valve permitted almost instantaneous replacement of the 10 per cent oxygen mixture by 100 per cent oxygen.

4. Patterson, J. E.; Clark, T. W., and Levy, R. L.: A Comparison of Electrocardiographic Changes Observed During the "Anoxemia Test" on Normal Persons and on Patients with Coronary Sclerosis, Am. Heart J. **23**: 837-846 (June) 1942.

The test was performed under basal conditions. The usual period of observation was twenty minutes. Electrocardiograms were made before the test and ten and twenty minutes after the patient began to breathe the mixture containing 10 per cent oxygen. If the patient experienced pain during the test, an effort was made to secure final tracings before changing from 10 to 100 per cent oxygen; however, if the distress seemed severe, 100 per cent oxygen was given at once. On completion of the test, 100 per cent oxygen was given routinely for from one to two minutes, a time adequate for the subsidence of cyanosis.

The electrocardiograms included the three standard leads and the precordial leads designated 4R and 4F (terminology of American Heart Association).[5]

RESULTS

On the basis of clinical evidence alone, the 289 persons subjected to the anoxia test were divided into four groups, as follows: group 1, controls; group 2, patients who had an essentially positive history for coronary insufficiency; group 3, patients who had an equivocal history, and group 4, patients who had an essentially negative history. In the following summary the expression "electrocardiographically positive test" indicates that during the anoxia test there were electrocardiographic changes of a type and degree satisfying one of the criteria of Levy.

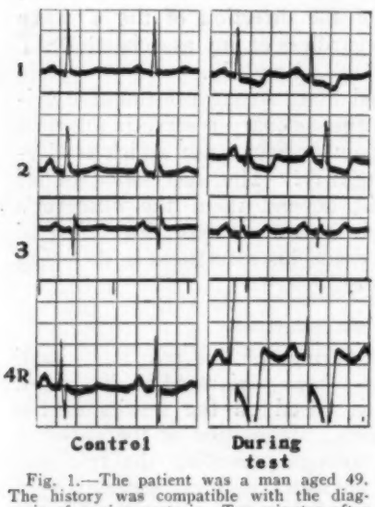

Fig. 1.—The patient was a man aged 49. The history was compatible with the diagnosis of angina pectoris. Ten minutes after inhalation of the mixture of 10 per cent oxygen and 90 per cent nitrogen was begun he complained of mild pain in the chest. The electrocardiogram designated "During test" was taken at this time. The depression of the ST segment in lead 4R indicates coronary insufficiency (criterion 1, Levy).

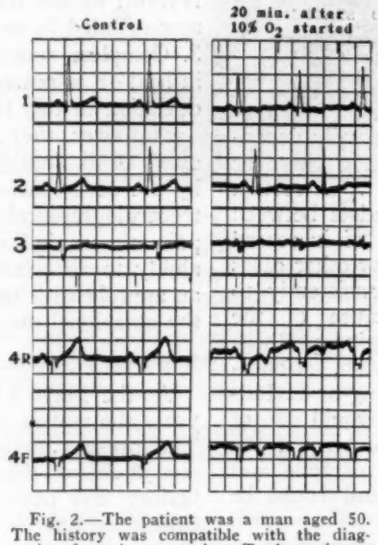

Fig. 2.—The patient was a man aged 50. The history was compatible with the diagnosis of angina pectoris. Twelve minutes after inhalation of the mixture of 10 per cent oxygen and 90 per cent nitrogen was begun he complained of a sensation of mild pressure in the sternal area of the chest. The complete reversal in the direction of the T wave in leads 4R and 4F indicates coronary insufficiency (criterion 3, Levy).

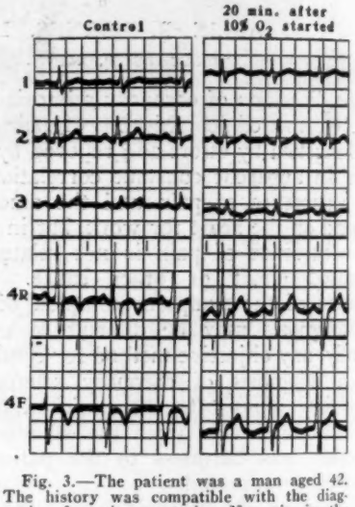

Fig. 3.—The patient was a man aged 42. The history was compatible with the diagnosis of angina pectoris. No pain in the chest occurred during the period of oxygen deprivation. The complete reversal in the direction of the T wave in leads 4R and 4F indicates coronary insufficiency (criterion 3, Levy).

Group 1 was composed of 7 healthy men who had experienced no symptoms suggestive of angina pectoris. None of these men experienced pain during the anoxia test and no significant electrocardiographic changes occurred.

Group 2 was composed of 92 cases in which a history highly suggestive of angina pectoris was obtained. This diagnosis probably would have been made, perhaps with some slight reservation, even if the anoxia test had not been performed. When the result of the test was positive, it was regarded as confirmatory evidence of coronary insufficiency. When the result of the test was negative, the tentative diagnosis based on clinical grounds, nevertheless, was maintained.

Of the 92 patients, 53.2 per cent had electrocardiographically positive tests, with or without pain; 19.6 per cent experienced pain but no significant electrocardiographic changes occurred, and 23.9 per cent had no pain and no significant electrocardiographic changes developed. In 3.3 per cent of cases the test was regarded as unsatisfactory.

Group 3 was composed of 108 cases in which there were certain features in the history suggestive of coronary insufficiency and also certain clinical manifestations of a doubtful or contradictory nature. In some cases angina of effort was present or absent under identical circumstances. In other cases the location of the pain in the chest had no relation to the sternum and had no typical extension. In some cases the psychoneurotic makeup of the patient together with the bizarre location of the pain in the chest and its unusual duration in a paroxysm aroused suspicion of its psychosomatic origin. In this group of patients the development of significant electrocardiographic changes during the period of deprivation of oxygen had the greatest value because of the doubtful diagnosis.

Of the 108 patients, 19.5 per cent had electrocardiographically positive tests, with or without pain; 18.5 per cent had pain but no significant electrocardiographic changes occurred, and 50 per cent had no pain and no significant electrocardiographic changes developed. In 12 per cent of patients the test was regarded as unsatisfactory.

Group 4 was composed of 82 patients who gave a history which had few if any features of a true anginal syndrome. The apprehensive individual who has a recent history of pain around the heart and is fearful of serious heart disease is representative of this group. In the opinion of the clinician there was little evidence to support the patient's suspicion.

Of the 82 patients, 1.2 per cent had an electrocardiographically positive test. Although the clinician recognized that the changes ordinarily would be regarded as indicative of coronary insufficiency, he maintained

5. Miss Bess Tews and her associates gave technical assistance in performing the anoxia tests.

his original diagnosis of myalgia of the chest wall. Eleven per cent of patients had pain but no significant electrocardiographic changes occurred, and 76.8 per cent had no pain and no significant electrocardiographic changes developed. In 11 per cent of cases the test was regarded as unsatisfactory (tables 1 and 2).

Unfavorable Reactions.—In general, the same type of unfavorable reactions were encountered in our patients as were reported by Levy and his associates [6] and by Burnett and his associates.[7] In 25 of the 39 cases in which an unfavorable reaction occurred, the test was regarded as unsatisfactory.

Nine patients had vasovagal reactions characterized by a fall in blood pressure associated with slowing of the pulse rate and, in some instances, with cold sweat, pasty color and the appearance commonly seen in shock. Three patients had nausea and, as a result, the test was discontinued. The test was discontinued when 4 additional patients complained of severe generalized discomfort or requested that the procedure be interrupted.

Within six minutes after the test was started, 1 patient became restless and complained of a "huge head" and nausea. The blood pressure dropped to 70 mm. of mercury systolic and 40 mm. diastolic. A questionable momentary loss of consciousness occurred and a few convulsive twitches were noted.

Loss of consciousness occurred in 3 cases. One of these patients fainted and another was "beginning to lose consciousness" when 100 per cent oxygen was introduced. In the third case the reaction was associated with development of arrhythmia and cardiac arrest for more than three seconds.

In 1939 Levy, Bruenn and Russell [8] reported that in their experience with the anoxia test arrhythmia had not occurred and that "ventricular premature contractions present in control records in several instances disappeared with the induction of oxygen want."

Our own results are at variance with these findings. One patient stated that with exercise his heart became irregular, and frequent ventricular premature contractions developed while he was breathing the mixture containing 10 per cent oxygen. This finding is interesting but not representative. In 5 other cases the number of premature contractions increased during the test, and in 8 more cases this type of arrhythmia persisted unchanged throughout the period of oxygen want. In cases in which the only cardiac irregularity was of the extrasystolic type the test was carried through to a satisfactory termination. Nodal premature contractions developed in 1 case. Nodal rhythm developed during the test in 2 cases. In 1 of these the altered rhythm started twelve minutes after the test was begun. The heart rate had increased from 62 to 98 beats per minute during the twelve minutes and dropped to 44 at the onset of nodal rhythm. The administration of 100 per cent oxygen was begun immediately and normal sinus rhythm was resumed. In the second case the onset of nodal rhythm was attended by the clinical picture of shock; that is, there was loss of consciousness momentarily and a blood pressure reading could not be obtained.

In 2 cases there was complete cardiac arrest, which in 1 case lasted for more than three seconds (fig. 4) and in the other for exactly four seconds. The first patient momentarily lost consciousness.

The 4 cases in which nodal rhythm or cardiac arrest developed during the test were reviewed. No characteristic which was peculiar to these from the standpoint either of the histories or of the physical status could be defined. The clinical evidence of angina pectoris was equivocal and the element of anxiety was large, perhaps unusually so. One of the 2 patients who had cardiac arrest had had a conduction disturbance (wide S wave pattern, bundle branch block) for at least three years. We know of no means of predicting when such a reaction might develop.

TABLE 1.—*Results in 289 Anoxia Tests*

Clinical Classification as to History of Angina Pectoris	Total Cases	No Pain or Significant Electrocardiographic Changes		Pain Without Significant Electrocardiographic Changes		Significant Electrocardiographic Changes Without Pain		Significant Electrocardiographic Changes With Pain		Unsatisfactory	
		Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Group 1, controls	7	7	100								
Group 2, essentially positive	92	22	23.9	18	19.6	13	14.1	36	39.1	3	3.3
Group 3, equivocal	108	54	50.0	20	18.5	6	5.6	15	13.9	13	12.0
Group 4, essentially negative	82	63	76.8	9	11.0	1	1.2	..	....	9	11.0

TABLE 2.—*Types of Electrocardiographic Changes in Seventy-One Tests* *

Criteria of Levy	Cases	Per Cent of 71 Tests
1. Sum of deviations of RS-T segment in four leads is 3 mm. or more	47	66.2
2. Partial or complete T_1 inversion plus deviation of RS-T segment of 1 mm. or more	2	2.8
3. Complete reversal of direction of T wave in lead 4 F	12	16.9
1 and 3	9	12.7
1, 2 and 3	1	1.4

* No changes occurred in the following combinations of criteria: 1 and 2, and 2 and 3.

THE SIGNIFICANCE OF CHANGES IN THE T WAVE IN THE PRECORDIAL LEADS

In publications concerning the anoxia test prior to June 1942, Levy and his associates [6] had maintained four criteria for electrocardiographic changes constituting a positive test. The first three are expressed in the introductory section of this paper. In 1942, however, they [4] discarded the fourth criterion, with the following statement: "The combination of partial T wave reversal and RS-T deviation of 1 mm. or more in lead 4F as the sole criterion of a positive test was observed in less than 2 per cent of the cases of coronary sclerosis and was found with equal frequency in normal persons. Its use as a sign of a positive reaction has therefore been discontinued."

6. Levy, R. L.; Williams, N. E.; Bruenn, H. G., and Carr, H. A.: The "Anoxemia Test" in the Diagnosis of Coronary Insufficiency, Am. Heart J. **21**: 634-656 (May) 1941. Levy, R. L.; Patterson, J. E.; Clark, T. W., and Bruenn, H. G.: The "Anoxemia Test" as an Index of the Coronary Reserve: Serial Observations on 137 Patients with Their Application to the Detection and Clinical Course of Coronary Insufficiency, J. A. M. A. **117**: 2113-2118 (Dec. 20) 1941.

7. Burnett, C. T.; Nims, M. G., and Josephson, C. J.: The Induced Anoxemia Test, Am. Heart J. **23**: 306-333 (March) 1942.

8. Levy, R. L.; Bruenn, H. G., and Russell, N. G., Jr.: The Use of the Electrocardiographic Changes Caused by Induced Anoxemia as a Test for Coronary Insufficiency, Am. J. M. Sc. **197**: 241-247 (Feb.) 1939.

Our experience confirms the wisdom of this revision of criteria, since the fourth one alone was satisfied in only 4 of our cases. In 2 of these cases the clinical evidence was essentially positive for angina pectoris, in 1 equivocal and in 1 essentially negative.

The significance of partial inversion of the T wave in lead 4F with slight segmental deviation is related closely to the more general problem of the significance

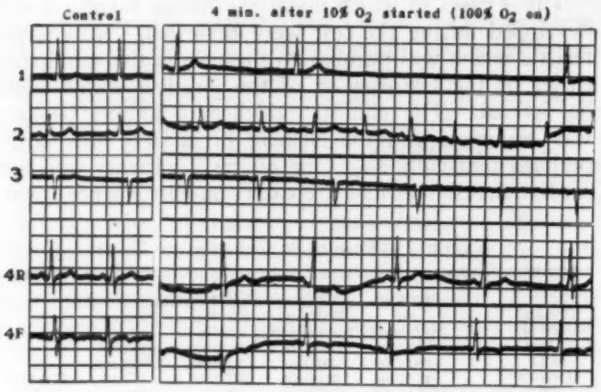

Fig. 4.—The patient was a man aged 41. The history afforded only highly equivocal evidence of angina pectoris. One of the types of cardiac arrhythmia that sometimes develops during periods of oxygen deprivation is shown in lead 1 of the electrocardiogram taken four minutes after inhalation of the mixture of 10 per cent oxygen and 90 per cent nitrogen was begun. The period of asystole lasted 3.4 seconds. Momentary loss of consciousness occurred. The diagnosis remained uncertain.

of alteration of the T wave in the precordial leads. As a positive finding Levy has retained among his criteria complete reversal of the T wave in lead 4F regardless of associated RS-T segment deviation in this lead. For this reason data concerning changes in this wave are important. Certain findings in the present series of tests are interesting, but their significance is mitigated by the diagnostically indeterminate nature of the related clinical material.

Diminution in the height of the T wave in lead 4F as a result of the anoxia test is recognized as a frequent occurrence in individuals who have a normal cardiac reserve. This same observation may be made relative to lead 4R. It seems probable that when the initial height of the T wave in the precordial lead is only 2 to 4 mm., the decrease in voltage that normally occurs during periods of oxygen deficiency might be sufficient to reduce the T wave to, or slightly below, the isoelectric line.

The 8 cases in our series in which the major change in the electrocardiogram during the test was of this type are grouped in column 1, table 3. Seven cases in which the T wave changes in the precordial leads were of comparable degree but were opposite in direction are grouped in column 2 of the same table. In these cases a slightly negative T wave in lead 4R or 4F became almost isoelectric or an upright T wave in these same leads increased in voltage without attendant segmental deviation. The 12 cases in which there was complete reversal of the direction of the T wave in lead 4F without other significant electrocardiographic change are grouped in columns 3 and 4.

The results of the tests listed in columns 1 and 2 were considered to be negative electrocardiographically, according to the criteria of Levy, whereas the results of those in columns 3 and 4 were considered to be positive.

This analysis suggests that a slight increase in height or decrease in negativity of the T wave in leads 4R and 4F more frequently is associated with a history compatible with the presence of coronary insufficiency than is a reduction in the height of this wave to the isoelectric level. We are not concerned with explanations of this observation and record it only because it may be significant if confirmed by further experience.

THE COMPARATIVE VALUES OF PRECORDIAL LEADS

Throughout this series of tests, as mentioned previously, we used both lead 4R and lead 4F. Since Levy and his associates [9] reported only their findings with lead 4F, however, changes in lead 4R were disregarded in determining whether the results of a test were positive or negative. As a matter of fact the results, regardless of which lead is used, are fundamentally the same, as illustrated by the fact that only four of our tests showed significant changes in lead 4R and not in lead 4F and only two tests showed the reverse situation.

INSTANCES OF STRIKING SEGMENTAL ELEVATION

While depression of the RS-T segment, especially in leads 4R and 4F, was the commonest type of change in the positive test, striking elevation of this segment occurred in 4 cases. In 3 of these, elevation of the RS-T segment was most pronounced in lead 3 and was accompanied by segmental depression in lead 1 (fig. 5).

THE EFFECT OF ALTITUDE AND OTHER VARIABLES

In connection with inspiration of oxygen-nitrogen mixtures, two questions pertaining to the physiologic state of the body arise. The first question, which is of practical interest, concerns the effect of geographic increase in altitude. The second question, which is more theoretical in nature, concerns determination of the pressure altitude for a person breathing air which is equivalent to the pressure altitude for a person breathing an oxygen-nitrogen mixture at a constant altitude.

In spite of various prediction formulas for averages, there are no absolute rules for determination of an individual's average alveolar partial pressure of oxygen in an anoxia test of short duration. There is considerable individual variability both in the initial alveolar

TABLE 3.—*Changes in T Wave in Precordial Leads*

Clinical Classification as to History of Angina Pectoris	Column 1 Low Amplitude; T 4R or T 4F Decreased in Height	Column 2 T 4R or T 4F Increased in Height Without Change in Direction	Column 3 Complete Reversal of Upright T 4F	Column 4 Complete Reversal of Inverted T 4F
Group 2, essentially positive	2	4	2	5
Group 3, equivocal	6	3	2	2
Group 4, essentially negative	6	..	1	..

partial pressure of carbon dioxide and in the rate and extent of lowering of this pressure. It must be emphasized that the test is individualized and of such short duration that respiratory equilibrium is not present.

The alveolar situation always must conform to the law of partial pressures. When applied to the alveoli, this law reads as follows: $B = p\,O_2 + p\,CO_2 + p\,H_2O + p\,N_2$, in which B designates barometric pressure, and $p\,O_2$, $p\,CO_2$, $p\,H_2O$ and $p\,N_2$ designate partial

9. Levy, Williams, Bruenn and Carr.[6] Levy, Patterson, Clark and Bruenn.[6] Patterson, Clark and Levy.[4]

pressures of oxygen, carbon dioxide, water vapor and nitrogen respectively. The partial pressure of water is assumed to be constant at 47 mm. of mercury. If the ratio of carbon dioxide lost to oxygen absorbed in the alveoli is assumed to be 1 and the person is assumed to be in nitrogen equilibrium, the preceding equation can be written as follows: $B = p\,O_2 + p\,CO_2 + 47$

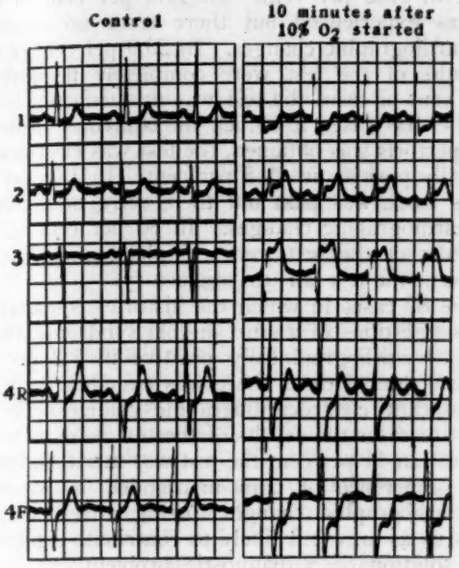

Fig. 5.—The patient was a man aged 38. Six days prior to examination recurring episodes of pain in the chest suggestive of severe coronary insufficiency had occurred. The routine electrocardiogram did not afford satisfactory evidence of recent infarction. Seven minutes after inhalation of the mixture of 10 per cent oxygen and 90 per cent nitrogen was begun the patient complained of slight pain in the left elbow. The electrocardiogram taken ten minutes after the test was begun is of particular interest because the changes recorded simulate those associated with acute infarction of the posterior portion of the left ventricle.

$+ f\,N_2\,(B - 47)$, in which $f\,N_2$ designates the volumetric fraction of nitrogen in the dry mixture.

Unfortunately the alveolar respiratory quotient cannot be predicted during the early respiratory response to anoxia, and as the partial pressure of nitrogen in the lungs is changed exact nitrogen equilibrium will not be present. It may be noted that when the alveolar respiratory quotient is below 1 the partial pressure of nitrogen is higher than $f\,N_2\,(B - 47)$ but that in the early anoxic response the alveolar quotient is likely to be unity or higher.

We think that the preceding alveolar equation is workable in its simple form and that it does not commit one to accurate predictions. It is apparent that, if the percentages of oxygen and nitrogen are fixed in the inspired dry mixture, the main determinants of the partial pressure of oxygen in the lungs are the barometric pressure and the partial pressure of carbon dioxide in the alveoli. With increases in ground elevation or higher altitudes, the barometric pressure would be decreased, and even though the pressure of carbon dioxide of individuals living at higher altitudes normally would be lower at first, the reaction to the test theoretically and practically would be more severe. When low alveolar partial pressures of oxygen, which are encountered when a dry mixture of 10 per cent oxygen and 90 per cent nitrogen is inspired, are related to the oxygen dissociation curve, they fall on the very steep part of the curve.

In addition to the fact that the alveolar partial pressures of oxygen that are encountered are in a critical range, there is also a possible increase in p_H of the blood coincident with increased ventilation of the lungs. This additional variable increases the difficulty of predicting the saturation of hemoglobin with oxygen from the dissociation curves of oxyhemoglobin and alveolar oxygen tension.

When these factors are considered, the deduction can be made that the extent of anoxemia among individuals inspiring the same mixture at the same barometric pressure would differ considerably. This deduction has been confirmed experimentally by Barach and others.[2] We believe that this variation in anoxemia, which cannot be controlled in the test, is one of the factors which determines whether the result will be positive or negative.

The second problem, that is, determination of the exact pressure altitude for a person breathing air which is equivalent to the pressure altitude for a person breathing a mixture of 10 per cent oxygen and 90 per cent nitrogen at a constant altitude, is somewhat conjectural if it concerns an individual rather than a group. This problem is not an integral part of this paper but rather it is of general interest. Excellent observations on the alveolar partial pressures of oxygen and carbon dioxide at various lowered barometric pressures have been made. The alveolar partial pressures of oxygen obtained when individuals have been taken rapidly from ground level to pressure altitudes of from 18,000 to 22,000 feet closely approximate those obtained when individuals at ground level have breathed a mixture of 10 per cent oxygen and 90 per cent nitrogen for a short period of time.

COMMENT

The clinical material analyzed in this report included many cases in which the existence of coronary insufficiency was not established or excluded. Hence any attempt to derive evidence for the definition of criteria for an electrocardiographically positive test is unwarranted. Evidence favoring the accuracy of Levy's criteria may be found, however, in the fact that electrocardiographic changes that satisfied one or more of his criteria developed in a high percentage of cases in which the clinical data favored the diagnosis of angina pectoris. Positive electrocardiographic changes occurred in only 1 case, in which the clinical evidence offered practically no support for the diagnosis of angina pectoris.

Our experience with pain as the sole expression of a positive test contrasted with our experience with electrocardiographic changes. In 11 per cent of 82 cases in which the histories were essentially negative for angina pectoris there was pain without significant electrocardiographic changes during the period of oxygen deprivation; in 19.5 per cent of 92 cases in which the histories were essentially positive there was pain without significant electrocardiographic changes. The larger percentage of cases in which the history was essentially positive and in which pain developed affords minimal grounds for relying on pain as an indication of coronary insufficiency. Levy and his associates suggested that the time of appearance of pain was considerably earlier in cases in which the test was positive electrocardiographically than in those in which it was negative. We have not confirmed this observation (table 4).

We agree with Levy and his associates[4] that "the successful use of pain as an index will depend upon the observer's ability to differentiate it from the minor discomfort of an apprehensive subject." Although pain as an index of diminished coronary reserve may be

helpful if used discreetly, this is not the type of evidence which primarily is being sought in oxygen deprivation studies. A full account of the subjective reactions of the patient is available before the anoxia test is undertaken. The subjective reactions of the patient to the test always must be evaluated in the light of knowledge concerning his temperament. If an individual of stable temperament complains of pain during the test, the ascription of his pain to coronary insufficiency is usually justifiable. If a patient who has a psychoneurotic temperament complains of distress, it may be justifiable to attribute his discomfort to extracardiac factors. The validity of these conclusions depends on the discriminating judgment of the clinician. When the positive or negative result of an anoxia test, however, is determined by the clinician's evaluation of the subjective reactions of his patient, then the test ceases to supply a novel type of information. Accuracy in the diagnosis of angina pectoris always has been dependent on the discriminating judgment of the clinician.

Consideration of this series of cases in which the diagnosis of angina pectoris was not established before the anoxia test was performed provided information concerning its usefulness as a diagnostic adjunct. One assumption must be made; that is, a positive test affords conclusive evidence of coronary insufficiency. The majority of the tests in which significant electrocardiographic changes occurred were performed in cases in which the histories were regarded as highly suggestive of angina pectoris. However, if the test had not been done, the clinician would have retained in most cases some reservation concerning the accuracy of the diagnosis. Any physician who has imposed on an otherwise healthy person a restricted program of activities and then has been harassed by a lingering doubt concerning the accuracy of his diagnosis of coronary sclerosis would value the confirmatory evidence of a positive anoxia test.

TABLE 4.—*Average Time of Appearance of Pain*

Clinical Classification as to History of Angina Pectoris	Significant Electrocardiographic Changes Absent		Significant Electrocardiographic Changes Present	
	Time, Min.	Cases	Time, Min.	Cases
Group 2, essentially positive.....	8	17	9	33
Group 3, equivocal.....	8	18	9	15
Group 4, essentially negative....	6½	9		

What is the value of the test in which the results are negative? Burnett and his associates [7] stated that "since the anoxemia test is designed to furnish objective evidence of coronary insufficiency, a negative or 'normal' response in a patient who presents equivocal evidence of coronary disease adds little to the diagnosis and may further cloud the clinical picture." Levy and his associates repeatedly have warned against the acceptance of negative results as evidence of adequate coronary circulation. Failure to recognize this well established principle will lead to confusion and to incorrect diagnosis. Even with this knowledge it is difficult on certain occasions to resist the temptation to reassure the patient and ourselves that coronary insufficiency does not exist because the anoxia test was negative.

SUMMARY AND CONCLUSIONS

The anoxia test was performed in 289 cases, according to the method established by Levy. In 282 instances the test was performed in cases in which some clinical evidence of angina pectoris existed, although in most of these cases this diagnosis could not have been made on the basis of clinical evidence alone. The results were electrocardiographically positive in 71 of the 282 cases (25 per cent).

Of the 92 cases in which the history was suggestive of angina pectoris, the test was electrocardiographically positive in 53.2 per cent. In 19.6 per cent of cases pain was experienced but there were no significant electrocardiographic changes. In 23.9 per cent of cases the results of the test were completely negative. In 3.3 per cent of cases the test was unsatisfactory.

Of the 108 cases in which an equivocal history of angina pectoris was obtained, the test was electrocardiographically positive in 19.5 per cent. In 18.5 per cent of cases there was pain but there were no significant electrocardiographic changes. In 50 per cent of cases the results of the test were completely negative. In 12 per cent the test was unsatisfactory.

Of the 82 cases in which the histories contained few if any suggestions of a true anginal syndrome, the test was electrocardiographically positive in 1.2 per cent. In 11 per cent of cases there was pain but there were no significant electrocardiographic changes. In 76.8 per cent of cases the results of the test were completely negative. In 11 per cent the test was unsatisfactory.

The occurrence of pain unattended by significant electrocardiographic changes during a test does not impress us as an event likely to contribute significantly to the solution of a diagnostic problem.

Twenty-five of 289 tests were regarded as unsatisfactory because one or several unfavorable reactions occurred. In 2 cases in which a brief period of cardiac arrest occurred, the reaction was regarded as dangerous.

In the majority of instances (66.2 per cent) in which the test was electrocardiographically positive, the only significant change consisted of a deviation, usually a depression, of the RS-T segment, totaling 3 mm. or more, in leads 1, 2, 3 and 4F. We think slight increase in height or decrease in negativity of the T wave in lead 4F or 4R more frequently is associated with a history suggestive of angina pectoris than is a depression to the isoelectric or diphasic level of a positive T wave in these same leads. Significant changes occurred in lead 4R and not in lead 4F in only four tests, and in lead 4F and not in 4R in only two tests.

Finally, the following observations concerning the choice of patients to be subjected to the anoxia test are presented in full recognition of the fact that further work in this field may necessitate a revision of opinion.

The anoxia test is not a laboratory short cut to the diagnosis of coronary sclerosis but is a means of substantiating a diagnosis of angina pectoris based on fairly convincing clinical evidence. In support of this conclusion (1) 53.2 per cent of 92 patients who had a history highly suggestive of angina pectoris had an electrocardiographically positive test and (2) of 82 patients who had minimal evidence of coronary disease only 1 had significant electrocardiographic changes during the period of oxygen want.

Use of the anoxia test should be restricted even among acceptable cases to instances in which (1) serious disagreement regarding diagnosis has occurred and (2) the establishment of a definite diagnosis is of such importance that acquisition of all helpful evidence is imperative. In some cases the presence of disease of the coronary arteries is of greater significance than in others. For a comparatively young person whose occupation entails much physical exertion or

nervous tension a restricted program of activities is a greater hardship than for an elderly person.

When use of the anoxia test is restricted to individuals selected in compliance with the foregoing standards, the possible danger to the life of the patient and the expenditure of time, effort and materials by the clinician are justifiable in view of the value of the information that can be obtained.

PROLONGED BLOOD CONCENTRATIONS AFTER ORAL ADMINISTRATION OF MODIFIED PENICILLIN

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It appears from the investigations made to date that successful oral administration of penicillin may hinge on complete neutralization of the acidity of the stomach plus a relatively slow release of this drug from some chemical which adsorbs it readily. In 1929 one of us,[1] following the studies of Gross,[2] utilized magnesium hydroxide in the purification of diphtheria toxin. It was noted at that time that this metallic hydroxide selectively adsorbed diphtheria toxin quite firmly in the presence of proteins. After adsorption vigorous treatment was required for the release of the exotoxin from the magnesium. Other metallic hydroxides acted similarly but appeared to be less effective in their binding power. However, in all cases selective adsorption occurred rapidly, resulting in a relatively pure diphtheria toxin.

On the basis that possibly penicillin, a biologic excretory product of a mold, might behave similarly, several manufacturers' products were treated with aluminum hydroxide gel U. S. P. and with magnesia magma U. S. P. by adding 30 cc. of the former and 20 cc. of the latter dropwise with constant agitation to 100,000 units dissolved in water. The penicillin and metallic hydroxides were then centrifuged at high speed and the penicillin concentration in the supernatant liquid determined.

In the case of the aluminum hydroxide, approximately 50 per cent of the penicillin added to it remained adsorbed on the sediment, while approximately 25 per cent of the penicillin remained adsorbed on the sedimented magnesium hydroxide. Both the aluminum and the magnesium hydroxide sediments were washed five times with distilled water. After three washings 27 per cent of the penicillin remained adsorbed on the aluminum hydroxide. Less than 0.5 per cent of the remaining penicillin was removed with the next two washings. However, all penicillin was released from the aluminum hydroxide on washing with buffer at p_H 6.0. It is of interest that after release from the aluminum hydroxide into buffer the penicillin solutions, originally yellow, were water clear and colorless. A similar result is obtained in the purification of diphtheria toxin by adsorption on magnesium hydroxide.

From the Food and Drug Administration.

1. Welch, H., and Megrail, E.: Lack of Antigenic Power of a Highly Purified Diphtheria Toxin and Detoxification by Ultraviolet Light, Proc. Soc. Exper. Biol. & Med. **27:** 595, 1930.
2. Gross, P.: Purification of Diphtheria and Other Bacterial Toxins by Adsorption, Proc. Soc. Exper. Biol. & Med. **26:** 696, 1929.

In the case of the magnesium hydroxide, which originally adsorbed approximately 25 per cent of the penicillin added to it, 16 per cent remained after the first washing. Four more washings with distilled water were not successful in removing this adsorbed penicillin. When penicillin was similarly treated with mixtures of aluminum and magnesium hydroxides, approximately 42 per cent of the penicillin was adsorbed. The first two washings with distilled water reduced this to 28 per cent. Practically none of the penicillin remaining was removed by three more washings. The penicillin adsorbed on mixtures of aluminum and magnesium hydroxides was removed from these chemicals on treatment with phosphate buffer, indicating that when penicillin is adsorbed on such mixtures it is preferentially adsorbed by the aluminum hydroxide. From these studies it appeared that penicillin is adsorbed more readily by aluminum hydroxide than by magnesium hydroxide but that magnesium hydroxide is more retentive.

ORAL ADMINISTRATION OF PENICILLIN ADSORBED ON ALUMINUM HYDROXIDE

In preliminary feedings, penicillin treated with aluminum hydroxide was used. Eleven volunteers (laboratory personnel) ingested in one dose 100,000 units of penicillin sodium in 20 cc. of water to which had been added dropwise, with constant agitation, 30 cc. of U. S. P. aluminum hydroxide. In all cases the preparation was given at 10 a. m., two to three hours after breakfast. As far as possible, bloods were taken one-half, one, two, four, seven and twenty-four hours after the penicillin was ingested. All blood samples were held in the refrigerator for twenty-four hours, following which the serums were removed by centrifugation and tested for penicillin activity by a series dilution technic[3] using Bacillus subtilis as the test organism. The standard used was the Food and Drug Administration calcium salt reference standard.[4] One unit of this standard invariably causes inhibition of the B. subtilis strain used in a dilution of 1:128. In chart 1 the results are presented in a composite curve. The number of determinations made at each point on the curve are shown. The individual curves followed the same general pattern. It will be noted that within thirty minutes the average concentration of penicillin in the blood was 0.29 unit per cubic centimeter. The average number of units in the serum after one hour was 0.125 per cubic centimeter, but this increased to 0.146 per cubic centimeter in one and one-half hours. This increase was due to the high level of 1 person who showed 0.375 unit per cubic centimeter of serum after one and one-half hours, while the other 3 persons on whom determinations were made at this time interval were 0.06, 0.06 and 0.09 unit per cubic centimeter respectively. At the end of the second hour the average amount of penicillin in the blood serum was 0.05 unit per cubic centimeter. This diminished to an average of 0.02 unit after four hours and to 0.015 unit after seven hours. On an average, the latter concentration was maintained through the twenty-fourth hour. Of the eleven tests made on the twenty-four hour blood samples in this series, 5 persons had concentrations of penicillin equivalent to from 0.03 to 0.045 unit per cubic centimeter of serum. The serum

3. Randall, W. A.; Price, C. W., and Welch, H.: The Estimation of Penicillin in Body Fluids, Science **101:** 365, 1945.
4. Methods Used by the Food and Drug Administration for the Assay of Penicillin, Revised January 1945.

of the remaining 6 persons showed no activity by the test used, which was set up to measure a minimum of 0.03 unit per cubic centimeter of serum.

As a control, 6 persons were given orally in one dose 100,000 units of untreated penicillin sodium. The results are shown also in chart 1. It will be noted that with untreated penicillin the serum concentrations are considerably lower one-half and one hour after

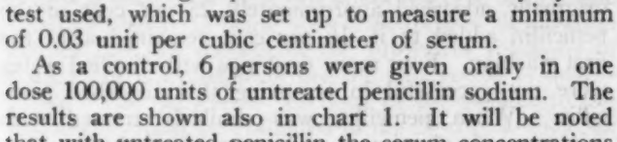

Chart 1.—Composite curves of blood levels following single oral dose of 100,000 units of (*A*) penicillin-aluminum hydroxide and (*B*) penicillin only. Numbers indicate the determination made at each point on curve.

ingestion. No penicillin could be demonstrated in the blood samples collected at the seventh and the twenty-fourth hour. Actually, of the 6 persons tested at the fourth hour 4 failed to show penicillin in their serums. By comparison, in the group given penicillin modified with aluminum hydroxide 5 of the 10 tested showed concentrations of 0.03 unit per cubic centimeter at the seventh hour, and they maintained this concentration through the twenty-fourth hour.

Since serum concentrations of penicillin reached nearly 0.30 unit per cubic centimeter within thirty minutes after ingestion of 100,000 units of penicillin modified with aluminum hydroxide but fell rapidly thereafter (chart 1), it seemed advisable to determine the effect of ingesting the same amount of penicillin at two hour intervals in four equal doses of 25,000 units each. Three million units of penicillin-aluminum hydroxide were prepared as described by adding to each 100,000 units 20 cc. of distilled water and 30 cc. of U. S. P. aluminum hydroxide. The penicillin represented the products of several manufacturers, but all were pooled in the preparation of the modified penicillin. Twenty-one persons were given 25,000 units (12.5 cc.) of the modified penicillin at 10 a. m., 12 noon, 2 p. m. and 4 p. m. Blood samples were obtained from all 21 test subjects one-half hour and twenty-four hours after ingestion. In addition, on 10 to 12 test subjects blood samples were taken two, two and one-half, four, four and one-half, six and six and one-half hours after ingestion and on 5 test subjects eight, twelve, fifteen, eighteen and twenty-eight hours after ingestion. The serum concentration levels of penicillin obtained are presented in a composite curve in chart 2, which shows that within one-half hour after each dose there is a definite increase of penicillin in the blood. After the first dose and subsequent increase in blood concentration of penicillin there is a fall in the concentration to 0.08 unit per cubic centimeter by the second hour, at which time a second dose of penicillin was given. The second dose was followed by an increase in the blood concentration of penicillin, as were the third and fourth doses. In the composite curve the average blood concentration level of penicillin one-half hour after the fourth dose is definitely increased over that obtained one-half hour after the first dose. It should be noted that after the first half hour the concentration of penicillin in the blood did not drop below approximately 0.08 unit per cubic centimeter until after the eighth hour (no penicillin was given after the sixth hour). From the eighth hour until the twelfth hour a concentration of 0.06 unit or more per cubic centimeter of blood was maintained. Between the twelfth and fifteenth hours the concentration dropped to 0.036 unit per cubic centimeter and this level was maintained through the twenty-eighth hour. By contrast, 6 persons given 100,000 units of untreated penicillin sodium, 25,000 units every two hours, had an assayable level for from seven to eleven hours.

Five persons were given, orally, penicillin modified with magnesium hydroxide prepared by adding dropwise, with constant agitation to each 100,000 units of penicillin sodium in 28 cc. of water, 22 cc. of U. S. P. magnesium hydroxide. Each person in this group was given 25,000 units (12.5 cc.) every two hours until a total of 100,000 units had been used. Blood samples were taken one-half hour and two, four, six and twenty-four hours after the first 25,000 unit dose was ingested. The curves obtained by plotting serum concentrations of penicillin against time were similar to those obtained with penicillin modified with aluminum hydroxide. Four of the 5 persons showed 0.06 unit per cubic centimeter in their serums twenty-four hours after the first dose had been administered. The amount of magnesium hydroxide used caused some laxative effect in 3 of the 5 persons in this series. However, magnesium hydroxide was as effective as aluminum hydroxide in the maintainance of penicillin in the blood after oral administration.

EXCRETION OF PENICILLIN IN THE URINE FOLLOWING MODIFIED PENICILLIN ORALLY

Eleven persons were given in a volume of 50 cc. a single oral dose of 100,000 units of penicillin modified with aluminum hydroxide. All urine was collected for a period of twenty-four hours. On an average, 13.6 per cent of the penicillin ingested was recovered in the urine. Twelve per cent of that recov-

Chart 2.—Composite curve of blood levels following 100,000 units of penicillin-aluminum hydroxide given orally in four doses of 25,000 units each at zero, two, four and six hours. Numbers indicate the determinations made at each point on curve.

ered was obtained in the first two and one-half hours. The largest amount excreted was 27.3 per cent and the least 5.5 per cent. Penicillin was demonstrated in the urine as late as the nineteenth hour but in low concentrations. Two of the 11 persons under study failed to show penicillin in the urine at the nineteenth

hour, while the other 9 individuals showed at this time an average total excretion of 47 units. For comparison, the urine excreted after the ingestion of 100,000 units of untreated penicillin sodium was determined in 10 persons. The average total recovery was 6.7 per cent of that ingested, and 6 per cent of this was recovered in the first two and one-half hours. None was recovered after the seventh hour.

The average total excretion over a twenty-four hour period following four oral doses of 25,000 units of penicillin modified with aluminum hydroxide was determined on 11 persons. The average total recovery was 7,245 units (7.2 per cent); the greatest recovery was 15 per cent, and the least 1.2 per cent. The doses of penicillin-aluminum hydroxide were given at zero, two, four and six hours, and urines were collected one hour after each dose and then at irregular periods thereafter. The average amount of penicillin excreted by the 11 persons in this group one hour after the first dose was 2,165 units, one hour after the second dose 1,385 units, one hour after the third dose 1,759 units and one hour after the fourth dose 1,187 units.

Since the penicillin-aluminum or penicillin-magnesium hydroxide mixtures may be prepared just before they are administered orally, there is no stability problem involved. After the aluminum hydroxide-penicillin and the magnesium hydroxide-penicillin are prepared, their stability seems to be similar to that of penicillin sodium in distilled water, since at refrigerator temperature (10 C.) both mixtures have been found to be stable for at least thirty days.

COMMENT

The mechanism by which relatively high concentrations of penicillin are maintained in the blood following oral administration of penicillin modified with aluminum hydroxide cannot be explained on the basis of the experimental work done to date. Certain facts, such as the strong neutralizing effect of aluminum hydroxide on the acid of the stomach, are established. The rapidity with which relatively high concentrations of penicillin may be demonstrated in the blood following a single oral administration of penicillin, modified with aluminum hydroxide, indicates that perhaps there is some absorption of penicillin directly from the stomach into the blood stream. This rapid increase in blood concentration of penicillin is demonstrable following each oral dose of penicillin-aluminum hydroxide. There is some indication at least of an accumulative effect since, as will be noted in chart 2, the concentration levels of penicillin reached after the second and fourth doses are considerably higher than that level reached following the first dose. Furthermore, following the first dose of penicillin-aluminum hydroxide (chart 2) in no instance did the serum concentrations of penicillin fall below what may be considered to be an effective therapeutic level until some time after the twenty-fourth hour, in spite of the fact that penicillin-aluminum hydroxide was not given after the sixth hour. It is suggested that the initial increase in blood concentration of penicillin following each dose of penicillin-aluminum hydroxide is the result of absorption through the walls of the stomach of penicillin which is either unadsorbed or loosely adsorbed on the aluminum hydroxide. Following this the penicillin-aluminum hydroxide passes into the upper intestine, where penicillin is released slowly from the aluminum hydroxide and adsorbed through the walls of this organ, thus reaching the blood stream via the portal system and the liver.

There is some difference of opinion concerning the concentration of penicillin in the blood necessary to exert efficient antibacterial action. It has been pointed out by Fleming,[5] after his studies on penicillin content of blood serum following various doses of this drug parenterally, that "we do not yet know whether it is better to maintain a constant low level of penicillin in the blood or to have a very high level for a short time after injection. . . . Clinically both systems have worked excellently." The oral administration of four doses of 25,000 units each two hours apart of penicillin modified by either aluminum hydroxide or magnesium hydroxide will result in a prolonged level of penicillin in the blood stream. It may be that the level of penicillin maintained by this dosage form will be effective in some diseases, but it can be postulated that in all likelihood it will not be effective in others. Actually, it probably will be necessary to maintain higher penicillin levels in the blood for the same disease in different individuals. However, if it becomes necessary to maintain high levels in the blood for longer periods of time, this may be accomplished by more frequent and larger doses. In preliminary studies with 150,000 units of penicillin-aluminum hydroxide given in six equal doses of 25,000 units each, serum levels of 1.0 to 1.5 units per cubic centimeter have been demonstrated.

SUMMARY AND CONCLUSIONS

A method of oral administration of penicillin modified with either aluminum hydroxide or magnesium hydroxide results in prolonged blood concentrations of this drug.

Blood levels of from 0.03 to 0.19 unit per cubic centimeter may be obtained for as long as twenty-four hours after the administration of 100,000 units in four doses of 25,000 units each. In some persons, serum concentrations of 0.06 unit were obtained thirty hours after the administration of 100,000 units in four doses of 25,000 units each.

Following each dose there is a pronounced increase in the blood concentration level of penicillin, and this blood level may be increased with subsequent doses. Relatively high levels of penicillin may be maintained in blood by increasing the frequency of the doses of penicillin-aluminum hydroxide.

Since the modified penicillin may be prepared at the time of use, no stability problem is involved.

After oral administration of the modified penicillin, relatively small amounts are excreted in the urine. The penicillin is apparently largely inactivated within the body. It appears that some absorption through the stomach wall is obtained followed by further slow absorption from the small intestine.

Because of prolonged penicillin concentrations in the blood following this method of oral administration, this dosage form may have some prophylactic value.

5. Fleming, A.; Young, M. Y.; Suchet, J., and Rowe, A. J. E.: Penicillin Content of Blood Serum After Various Doses of Penicillin by Various Routes, Lancet **2**: 621, 1944.

Good Traits.—In human nature good traits go together. To him that hath a superior intellect is given also on the average a superior character; the quick boy is also in the long run more accurate; the able boy is also more industrious. There is no principle of compensation whereby a weak intellect is offset by a strong will, a poor memory by good judgment or a lack of ambition by an attractive personality. Every pair of such supposed compensatory qualities that has been investigated has been found to show correspondence.—Thorndike, E. L.: *Harper Hosp. Bull.* **111**:227, 1920.

THE USE AND ABUSE OF GOLD THERAPY IN RHEUMATOID ARTHRITIS

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Unfortunately, some physicians employ gold salts in any type of arthritis; a few begin gold therapy at the first complaint of joint pain. Workers experienced in the care of rheumatic patients agree that gold is of no value in any type of joint disease except rheumatoid arthritis; some have not observed pronounced improvement even in the latter disease. Because of this indiscriminate, frequent abuse of gold salts in many forms of joint disease, the known facts concerning gold therapy in rheumatoid arthritis are discussed here briefly.

There are several important facts concerning gold therapy in arthritis:

1. Gold is of no value in any form of joint disease except rheumatoid arthritis.
2. Gold does not benefit all patients with rheumatoid arthritis.
3. Gold is not the final answer to the treatment of rheumatoid arthritis.
4. Toxic symptoms may appear at any time during this form of therapy.
5. From 10 to 20 per cent or more of patients who have received gold therapy relapse after stopping the drug.
6. Extreme care must be used during gold therapy and the physician must be familiar with the details of such treatment before undertaking this.
7. Injections of certain gold salts in proper dosage may be followed by subjective and objective evidence of improvement in the majority of selected patients with rheumatoid arthritis.

Gold salts are not advisable routinely at the onset of every case of rheumatoid arthritis. Conservative therapy results in some improvement in many patients with this disease when these individuals are followed carefully over a period of five to ten years. If the patient with rheumatoid arthritis obtains no benefit from conservative measures over a period of several months or if he grows steadily worse, gold therapy may be given if the physician is well acquainted with this form of therapy. Gold is still too dangerous for common use by the physician unless he has had special experience in this field.

Most specialists in rheumatic disease no longer believe that there is any specific virtue in the treatment of arthritis by bee venom, chaulmoogra oil, vaccines or sulfur except perhaps as a form of psychogenic therapy. The significance of focal infection in most cases of rheumatoid arthritis is still open to question. It is generally agreed that removal of focal infection by itself will not produce any great amelioration in the symptoms in most cases of rheumatoid arthritis. Fever therapy helps only a small percentage of these patients and the resulting improvement is usually only temporary. This does not apply to short periods of mild physical fever with temperatures up to 100 or 101 F., which may be definitely beneficial to some of these patients. The use of massive doses of vitamin D is still under investigation, but most rheumatologists agree that although some patients with rheumatoid arthritis may be benefited by this form of therapy the improvement is usually only temporary and in many cases disappears when the drug is stopped.

From the Arthritis Clinic of the Hospital of the University of Pennsylvania.

One should always emphasize the necessity of individualizing the program for the care of patients with rheumatoid arthritis. The program generally employed for this disease includes adequate mental and physical rest (with avoidance of emotional upsets if possible); local rest to the involved joints by means of splints when these are indicated; a nourishing, high vitamin, high caloric, anticonstipation diet unless the patient is decidedly overweight; proper physical and occupational therapy; orthopedic care as indicated; removal or treatment of definite focal infection as a general health measure to lessen the load of infection which the individual is carrying, and blood transfusions in some cases and symptomatic care as indicated including analgesics, sedatives and so forth.

Gold has been used as a therapeutic agent for many centuries. It was recommended as a panacea in the eighth century and was advocated in 1500 by Paracelsus together with mercury as an elixir of life. Although inorganic preparations of gold were in use until 1916, many organic compounds have been developed since that time. In 1913 Feldt [1] showed that certain preparations of gold possessed antibacterial properties. In 1927 he also showed that gold compounds were effective against experimentally produced streptococcic and spirochetal infections in mice. Lande [2] and Pick [3] reported on the use of gold preparations in human chronic polyarthritis in that same year. Forestier [4] popularized this form of therapy after he had treated large numbers of arthritic patients with gold preparations.

The Council on Pharmacy and Chemistry [5] has recognized the use of gold preparations only in the treatment of lupus erythematosus. Gold salts have been advocated for pulmonary tuberculosis, epidemic encephalitis, bronchopneumonia, asthma, influenza, migraine, malnutrition, alcoholism, typhoid, septicemia and many other diseases. Gold salts have been suggested as an analgesic, antispasmodic, sedative, hematinic, cardiac stimulant and even for the treatment of neurosis, debility and acute and chronic arthritis. There is no evidence substantiating the great majority of these claims.

Until recently the widespread use of gold was limited by its untoward reactions, the crudeness of the available preparations and the uncertainty of the dose. Because of the supposed beneficial action of gold salts in tuberculosis, Forestier believed that this metal should also be of value for patients with rheumatoid arthritis (which appeared to him to be a chronic wasting disease similar in some respects to tuberculosis).

Experimental animal and human clinical work now suggests that gold may be an important addition to our therapeutic armamentarium. Sabin,[6] Freyberg [7] and others have shown that gold preparations are definitely beneficial in the arthritis produced experimentally in

1. Feldt, A.: Deutsche med. Wchnschr. **39**: 549, 1913.
2. Lande, K.: Die günstige Beeinflussung schleichender Dauerinfekte durch Solganal, München. med. Wchnschr. **74**: 1132 (July 8) 1927.
3. Pick, E.: Versuche einer Goldbehandlung des Rheumatismus, Wien. klin. Wchnschr. **40**: 1175 (Sept. 15) 1927.
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mice by means of pleuropneumonia-like organisms. Dawson,[8] Freyberg,[9] Boots,[8] Hartung,[10] Cecil,[11] Snyder[12] and others have reported that rheumatoid arthritis in human beings has been definitely benefited by injections of gold. Others are not impressed by the results of gold therapy. Several years ago Bauer[13] observed definite subjective and objective improvement in only 4 of 30 patients treated with gold salts. In his experience these results were no better than the usual treatment with rest, a high caloric, high vitamin diet, analgesics and simple physical therapy. It was his opinion at that time that within ten years gold therapy would go the way of many previous rheumatic remedies and would not be considered the meritorious, antirheumatic remedy that it is hailed today. Other rheumatologists have used gold salts in rheumatoid arthritis "with hopes but with not very high hopes."

In most of the published reports on the use of gold in rheumatoid arthritis the results are very encouraging. Gold therapy at present seems to be the only drug which shows promise of checking the activity of rheumatoid arthritis; it is still imperfect and must be used with care.

Gold seems in some manner to arrest or lessen the inflammatory process in many cases of rheumatoid arthritis. It will not repair damaged cartilage or bone, will not reconstruct joints and will not rehabilitate the arthritic derelict who has crippling deformities and whose arthritis has been burned out after years of activity of the process. The patient who derives the greatest benefit from proper chrysotherapy is the one with active rheumatoid arthritis, preferably in the early stage of his disease. Although gold therapy is most effective in the early stages of rheumatoid arthritis, it frequently relieves pain and stiffness even in advanced cases and is worthy of a trial for such patients if there is still evidence of an active process at that time.

The physician should not use gold salts in any form of rheumatic disease other than rheumatoid arthritis. There is no indication for gold therapy in degenerative joint disease, as our present concept is that this is a process of aging and wear and tear and that there is no inflammatory process within the joints in these individuals. Likewise, gold therapy is of no value in gout, fibrositis, subdeltoid bursitis or specific infectious forms of arthritis.

MODE OF ACTION OF GOLD SALTS IN RHEUMATOID ARTHRITIS

The mode of action of gold salts in rheumatoid arthritis is unknown. Dawson and Hobby[14] have shown that gold salts have active chemotherapeutic properties against hemolytic streptococcic infection in mice comparable to that obtained with the sulfonamides. Hartung found that subcutaneous injections of gold salts were followed by a manifest increase in the bacteriostatic power of the patient's serum against the hemolytic streptococcus. Others have believed that gold acts by stimulating the reticuloendothelial system, but there is no good evidence in favor of this. Leichentritt and his co-workers[15] thought that gold might produce a diuretic effect with loss of tissue fluid and improvement in the joint symptoms. Other workers previously noted improvement in joint symptoms following the loss of fluid from periarticular tissues which accompanied the diuresis from ammonium chloride and mercupurin. Still others have suggested that gold therapy may be a prolonged acting mild shock therapy.

FATE OF GOLD IN THE HUMAN BODY

Although a small amount of gold is excreted through the intestine and the bronchial mucosa, most of it is excreted through the kidneys. Gold enters practically every cell of the body shortly after it is injected, and the greatest concentrations are found in the liver, spleen, kidneys and skin. Gold has been detected spectrographically in aspirated synovial effusions from the knee joints of patients with rheumatoid arthritis who have been treated with gold salts.

Freyberg and his associates[16] found that gold salts are transported in the blood plasma following intramuscular administration. Although the gold values of plasma and urine may vary with the size of the weekly dose injected, these are not directly proportional to this. The blood level of gold usually increases as the amount of gold injected increases. Although daily plasma values for gold may fluctuate somewhat from day to day, these are usually increased after each injection and remain at this higher level or decrease but slightly until the next injection is given.

The physician should bear in mind this large retention of gold. If large doses of gold salts are given (such as 100 mg. at a dose) approximately 20 per cent is excreted per week. During a course of gold therapy 80 per cent of the injected gold apparently remains in the body. This increasing retention of gold is extremely important clinically, as gold may be found in the urine or plasma for many months in diminishing amounts after the last injection of gold. If the weekly injections of gold are continued at a smaller dose, gold disappears from the urine more rapidly. Although gold has been found in the urine for ten months or more following the last weekly injection of 100 mg. of gold salts, when the weekly injections are limited to 50 mg. of the gold salt the urine may show no gold within a period of three months following the last injection. If still smaller doses are used (such as 25 mg. of the gold salt—which is the maximum dose we employ in most instances at present) the urine may show no gold four weeks following the last injecion. Block and Buchanan[17] have devised an extremely accurate and specific photoelectric colorimetric microchemical method for determining gold in biologic tissues and fluids.

There has been much confusion concerning the value of colloidal gold salts. The urine and plasma gold values vary greatly in different patients following the intramuscular or oral administration of colloidal gold

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16. Freyberg, R. H.; Block, W. D., and Levey, S.: Metabolism, Toxicity and Manner of Action of Gold Compounds Used in Treatment of Arthritis, J. Clin. Investigation **20**: 401 (July) 1941.
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salts. In some instances no gold is found in the plasma or urine after large amounts of colloidal sulfides are given. Others may absorb gold and have urinary plasma values comparable to those seen with the soluble salts of gold. In most persons, however, very low plasma gold concentrations are found following the administration of colloidal gold sulfide; these patients usually excrete very little gold in the urine.

Colloidal gold preparations are not expected to be as effective therapeutically as other gold salts, mainly because of the rapid phagocytosis of the particles of gold by the reticuloendothelial system with insignificant plasma gold concentrations. Although colloidal gold preparations may produce only few and mild toxic reactions, the gold particles are usually removed from the circulation so rapidly that both toxic reactions and favorable therapeutic effects are prevented.

DOSE OF GOLD SALTS IN RHEUMATOID ARTHRITIS

The dose of gold salts used in the treatment of rheumatoid arthritis is still in the experimental stage. The therapeutic effectiveness of gold probably depends on its absorption and its remaining in the circulation until it arrives at the site of action. Gold preparations which my associates and I have found to be of particular value in the treatment of rheumatoid arthritis include sodium aurothiomalate,[18] aurothioglucose,[19] sodium aurothiosulfate and calcium aurothiomalate.

In an attempt to find the optimal dose of gold salts for patients with rheumatoid arthritis, we progressively decreased the amount of gold given each week until we arrived at the following schedule. Although the doses are small, the therapeutic results seem, in the long run, to be approximately as good as with larger individual doses, and relapses of the disease occur much less frequently. With this smaller dose given intramuscularly we have not seen any serious toxic effects in the last hundred patients so treated. It must be remembered, however, that any schedule of dosage for gold salts is still subject to change, as the optimal dose is not yet known and patients vary widely in their tolerance to gold salts.

We give all injections intramuscularly. The following dosage schedule applies to either sodium aurothiomalate or aurothioglucose. The doses are in milligrams of the gold salts. The first four injections are given at intervals of three or four days and consist of 5 mg. each. All subsequent injections are given at weekly intervals. Ten mg. is given for the fifth and the sixth doses and subsequent injections are of 25 mg. The seventh to the fourteenth injections inclusive are of 25 mg. each. If the patient is definitely improving, as evidenced by lessening of his joint pain, swelling and stiffness and reduction in the sedimentation rate, the 25 mg. weekly injections are continued for an additional twenty-four weeks unless any signs of toxicity appear. If the patient has not definitely improved following the first fourteen injections, the weekly dose is increased to 50 mg. and this dose is continued for a total of twelve weekly injections. If improvement is not noted at the end of this time, one should be pessimistic concerning the use of further gold therapy for that particular patient. It is usually futile to repeat the course of gold therapy of those individuals who have had no improvement at all by such a first course of treatment.

If improvement is definitely noted after the first course of gold, a rest period of from six to eight weeks is permitted, during which time no gold is given. If a relapse in the arthritis occurs, gold therapy is begun after a six week period; in other cases the full eight weeks is allowed to elapse before the second course is given, and the entire first course of therapy is repeated.

Such a course of therapy permits the injection of a total of 850 mg. of the gold salt (or 425 mg. of metallic gold). In some cases, when the gold is well tolerated, if improvement continues but the sedimentation rate has not yet become normal a third course of gold is given after an interval of eight weeks following the termination of the second course.

Some workers have advocated that one should give approximately 50 per cent more aurothioglucose than sodium aurothiomalate in order to obtain biologically equivalent effects, as plasma gold concentrations following the administration of aurothioglucose average only 65 per cent of those following a similar dose of sodium aurothiomalate. Clinically we have obtained results from the smaller doses of aurothioglucose which seemed comparable, in the long run, to equal doses of sodium aurothiomalate.

If one uses gold sodium thiosulfate, it is advisable to increase the dosage schedule by one third, as gold sodium thiosulfate contains only 37 per cent of metallic gold as compared with 50 per cent of metallic gold in both sodium aurothiomalate and aurothioglucose. Although many other preparations of gold are available, insufficient work has been published concerning these to permit a final evaluation of their toxicity and clinical effects.

In the treatment of children with rheumatoid arthritis, proportionately smaller doses of gold salts should be given.

PRECAUTIONS DURING GOLD THERAPY

Either the patient or his family should be advised of the possibility of toxic reactions from gold. Any physician wishing to administer gold salts in rheumatoid arthritis must familiarize himself with the early signs of intolerance to this metal. The patient should be questioned and examined before each injection for any signs of toxicity (particularly rash, itching, sore mouth, metallic taste, jaundice, loss of appetite or persisting indigestion). We perform a complete blood count and urinalysis before each injection. Although this may prove unnecessary, a blood count and urinalysis should be performed at least every two or three weeks during the course of gold therapy.

If any evidence of toxicity appears, gold should be stopped at least temporarily. Some of these patients can tolerate injections of gold later.

Absolute contraindications to gold therapy include any history of purpura or agranulocytic angina; moderate or pronounced renal or hepatic disease; pregnancy; hemophilia; severe diabetes mellitus; colitis; severe anemia or any hemorrhagic tendency; severe eczema or chronic dermatitis; severe bronchial asthma, or any serious systemic illness other than the rheumatoid arthritis itself. Psoriasis is not a contraindication to gold therapy, although individuals with rheumatoid arthritis and psoriasis have responded less well than individuals without psoriatic skin lesions.

TOXIC REACTIONS FOLLOWING GOLD THERAPY

The most serious reactions which occur following gold therapy and which fortunately are very infrequent with small doses of gold and proper care are purpura hemorrhagica, severe exfoliative dermatitis, ulcerative enteritis, acute yellow atrophy of the liver, agranulo-

18. Myochrysine is the proprietary name for sodium aurothiomalate.
19. Solganal-B-Oleosum is the proprietary name for aurothioglucose.

cytic angina and aplastic anemia. Although the mortality following the administration of gold salts some years ago reached as much as 3 per cent or more, this has now been lowered to less than 0.5 per cent. Fortunately, we have had no fatalities following the administration of gold salts.

If small doses of gold salts are employed, severe general reactions are usually avoided, but pruritus and urticaria may occur. Less than 10 per cent of patients with rheumatoid arthritis must discontinue the injections of gold permanently because of intolerance to the drug.

The most common cutaneous reactions following gold therapy are erythema, generalized pruritus and urticaria. Almost any type of rash has been reported as a complication following gold therapy, including herpes, exfoliative dermatitis, leukoplakia, lichen planus, papular eruptions, desquamation, morbilliform rash, erythema nodosum and folliculitis.

Pruritus occurs commonly following gold therapy; it may be generalized or localized to one or more parts of the body. Local or general erythema is a frequent complication. Fortunately, exfoliative dermatitis occurs very infrequently. When gold compounds are stopped temporarily, erythema, pruritus and other mild skin lesions usually clear within a few weeks and the gold can in most instances be begun again.

Oral reactions include a metallic taste in the mouth and a sore tongue and gums. Some patients may experience dysphagia, loss of taste, anesthesia of the tongue or even an ulcerative stomatitis or hemorrhagic gingivitis.

Gastrointestinal symptoms are not uncommon following gold therapy and consist mainly of nausea and epigastric distress. Some patients may experience vomiting, colicky abdominal pains and diarrhea. Ulcerative enteritis has been reported occasionally.

Albumin or red blood cells may appear in the urine following gold therapy. Anemia may follow prolonged administration of gold, and occasionally one notes the development of hepatitis or acute yellow atrophy of the liver. Various respiratory, nervous and ocular complications have been observed following gold therapy, but these are usually rather mild. Rarely one sees an iritis or a retinitis following gold therapy. In these cases it is difficult to determine whether the iritis is a part of the general picture of rheumatoid arthritis or whether it has resulted from the gold.

A few patients may complain of additional pains in the joints and a temporary increase in joint swelling and stiffness for twenty-four hours following an injection.

Toxic reactions may appear at any time following the first injection up until several months after the complete cessation of therapy. When toxic complications occur, the most frequent are pruritus, dermatitis, stomatitis and gastrointestinal symptoms, including some change in taste.

PREDICTION AND PREVENTION OF TOXIC REACTIONS

There is no reliable method of predicting which patients will develop signs of toxicity from gold. The factors on which such reactions depend are not known. Patch tests with gold do not adequately reveal sensitivity to this metal. There is no certain method of preventing untoward reactions from gold salts. Various workers have suggested the concomitant use of vitamin B, large amounts of fruit juices, liver extract or niacin, but in most instances such measures have not eliminated the toxic reactions. Once a toxic reaction has developed, this must be treated symptomatically. There is no specific treatment for these.

One should never neglect any symptom which the patient mentions during the course of chrysotherapy, as this may be the early evidence of a toxic reaction. Patients vary greatly in their tolerance to gold salts.

Gold therapy should be stopped when even a mild reaction occurs. Gold should not be administered again until at least several weeks after the complete disappearance of the reaction. When gold therapy is begun again, minimal doses should be given—such as 10 mg. of the gold salt—this being increased cautiously at weekly intervals until 25 mg. has been given as a maximum for any one injection. Gold therapy should not be resumed for any patient who develops agranulocytic angina, purpura hemorrhagica, exfoliative dermatitis, pronounced albuminuria, aplastic anemia or severe jaundice.

RESULTS FOLLOWING THE ADMINISTRATION OF GOLD SALTS

When small doses of gold salts are used, the patient does not usually notice definite improvement until from one to three months of therapy have passed. The first symptom which is relieved is pain in the joints. Following this, the joint swellings become softer and gradually disappear. The patient's general status also improves and his appetite and strength return while his fever slowly subsides.

In patients whose rheumatoid arthritis is still in the early stage with the inflammatory process limited chiefly to the soft tissues, the improvement following cautious administration of gold salts may be amazing. The results following gold therapy are not so spectacular in the more advanced cases when there is pronounced muscular atrophy, cartilaginous erosion and contractions. Even in these patients, however, the inflammatory process may be checked and the swelling and pain may be reduced. Gold therapy does not form the sole treatment of these patients; the whole individual must be treated as well as his joints.

RELAPSES FOLLOWING GOLD THERAPY

Although the incidence of relapses following gold therapy may be as high as 35 per cent or more in some series, a much smaller incidence is noted when gold is given for a prolonged period in smaller individual doses. Although relapses following gold therapy appear most often within six to twelve weeks following the discontinuance of the drug, in some instances these may occur a year or two later.

SUMMARY

Conservative therapy should be used for at least several months for patients with rheumatoid arthritis before employing gold salts, except those individuals with a rapidly progressing form of the disease. Some workers employ gold salts at the onset of rheumatoid arthritis because results are better in the early cases. Gold salts should not be used in any form of joint disease except rheumatoid arthritis.

One should never insist that any patient with rheumatoid arthritis receive gold therapy because of the possibility of toxic reactions and because gold therapy is not effective in all patients with rheumatoid arthritis; relapses occur in some of these patients when gold is stopped.

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THE IMPORTANCE OF DETECTING TUBERCULOSIS IN CHILDREN

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Children infected with tubercle bacilli under the age of 12 years occasionally develop the acute reinfection type of tuberculosis, such as miliary disease, pneumonia, meningitis, pericarditis, pleuritis, peritonitis and synovitis. During this age period the chronic reinfection type of disease occasionally develops in the extrathoracic organs such as the bones and joints, but the lungs are involved with great rarity. The reinfection type of chronic pulmonary tuberculosis begins to make its appearance among tuberculin reactors in the early teen ages and increases in frequency with the decades. Since this fact was established the previous enthusiasm for examination of school children has waned; indeed, in some places such work has been abandoned. This is an extremely unfortunate situation and is without practical or scientific foundation.

Every child who reacts to tuberculin has primary tuberculosis (tuberculous infection). This disease begins with the first focalization of tubercle bacilli by neutrophils. From this stage it is a matter of reinfections and the like which determine whether the disease will incapacitate or kill. Illness and death from tuberculosis always begin with the simple and apparently harmless infection, just as "a journey of a thousand miles begins with a single step." To refuse or neglect to find the infected child and conduct the necessary procedure in his behalf in any community is to ignore or overlook an important phase of tuberculosis work.

The finding of primary tuberculosis (tuberculous infection) in a child invariably establishes two important facts: 1. Usually a contagious case has been in the child's environment. (Obviously the infected person should be sought, if still alive, and be prevented from spreading tubercle bacilli.)

2. The child has at least lesions of primary tuberculosis containing living tubercle bacilli. Moreover, his tissues have become so sensitized to tuberculoprotein that this substance is now a deadly poison to them. The sensitivity makes reinfections from exogenous or endogenous sources far more dangerous to him than was the first infection; therefore physicians, public health workers and parents must be constantly on guard for the destructive type of lesions in any one of many parts of his body.

The toll of primary tuberculosis is far greater than is generally realized. Bogen[1] made a painstaking analysis and concluded that approximately 50 per cent of infected persons at some time have clinical lesions. Not all who develop such lesions die from them—many are not even incapacitated. Nevertheless, the toll in morbidity and mortality is significant. Indeed, in parts of the world where all adults are infected, 25 to 30 per cent of the total number of deaths have been reported as due to tuberculosis.

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1. Bogen, Emil: The Toll of Tuberculous Infection, Am. Rev. Tuberc. **42**: 253, 1940.

Since infection with tubercle bacilli ultimately carries such a high toll it is fortunate that a simple, harmless, inexpensive but highly specific and accurate test is available to determine its presence. There is no phase of the examination for tuberculosis which provides as much specific and accurate information for so many people as the tuberculin test. We are able to inform every reactor that primary lesions containing living tubercle bacilli are present. The only exception is that when all bacilli die sensitivity of the tissues lingers for a time before it completely disappears. Every nonreactor can be told that he does not harbor living tubercle bacilli. The two exceptions are (1) during the preallergic stage and (2) for a short time before death in both acute and chronic forms of the disease. The tuberculin test is the only phase of the examination that is valuable in both a positive and a negative way. All other phases such as auscultation and microscopic and x-ray inspections are helpful when positive findings are revealed, but negative results do not rule out tuberculosis.

We have previously stated[2] that by the tuberculin reaction one obtains the best criterion of the tuberculosis situation in a community with a stable population. It promptly and accurately detects persons in all ages of life who have lesions containing living tubercle bacilli in their bodies. As all tuberculin reactors have been exposed directly or indirectly to contagious cases of tuberculosis, the test provides much information as to the number of such cases which have been allowed to exist in a community. Moreover, when properly administered periodically it is our best criterion as to the effectiveness of tuberculosis control in any community. Obviously an increase in infection attack rate indicates that the control measures have not been satisfactory, whereas a significant decrease is excellent evidence that effective work has been done. Wherever large numbers of contagious cases of tuberculosis are permitted to exist among people or animals without adequate isolation or control, a high percentage of children develop primary tuberculosis. Moreover, testing children gives one an idea of the potential clinical tuberculosis load of the future. If children are not being infected in large numbers, in all probability not many adults are being infected and reinfected from exogenous sources—obviously, the lower the incidence of infection and reinfection, the lower the morbidity and mortality from clinical tuberculosis.

In 1926 the tuberculin test was administered to children in Minneapolis grade schools, which were selected on the basis of their distribution throughout the city.[3] The percentage of reactors ranged from approximately 15 at the age of 6 to 70 at the age of 14 years (chart 1) with an average of 47.33 (chart 2). Thus, the infection attack rate had been so high that nearly one half of the grade school children had primary tuberculosis (tuberculous infection). The explanation for this unfavorable situation was evident. For example, in 1921, when the population of the city was 384,571, the tuberculosis mortality rate was 115 per hundred thousand (443 deaths). The municipal and county sanatoriums had a combined bed capacity of 250. In 1924 the municipal sanatorium, with 130 beds occupied by advanced cases, was abandoned because the county sanatorium had increased its capacity and was thought

2. Myers, J. A.: The Detection of Tuberculous Infection, J. A. M. A. **112**: 1904 (May 13) 1939.
3. Harrington, F. E., and Myers, J. A.: Studies on Tuberculosis in Infancy and Childhood: X. Tuberculous Infection Among Minneapolis School Children as Revealed by the Intracutaneous Test, Am. Rev. Tuberc. **14**: 454, 1926.

sufficient to care for all contagious cases. Nevertheless in 1925, when the total bed capacity in the county sanatorium was 417, when a small private hospital was operating to capacity and when a number of city patients were being housed in the state sanatorium and the veterans' hospital, there still remained an average of 120 patients on the county sanatorium waiting list. There was also a large number of tuberculous patients who refused to apply for institutional care and who remained in their homes until death. Treatment in the homes was not conducted according to modern methods; that is, there was little or no attempt to isolate patients and protect their associates against bacilli. Moreover, most patients had such advanced disease when detected that it was impossible to convert them from the contagious to the noncontagious stage.

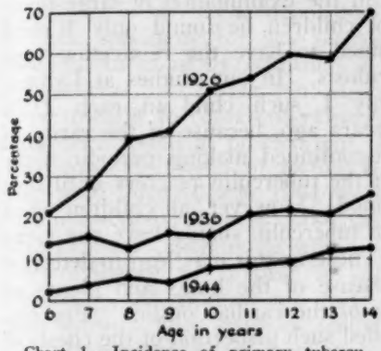

Chart 1.—Incidence of primary tuberculosis (tuberculous infection) among children in the same schools at intervals of approximately one decade.

While a pasteurization ordinance was in effect, there were numerous dairy products consumed by the citizens which had not been pasteurized. At that time only a few counties in the state had been accredited with reference to tuberculosis in cattle. Thus, tubercle bacilli were rife, as was reflected in the incidence of primary tuberculosis (tuberculous infection) among children.

With the continuance of this situation satisfactory control of tuberculosis could not be anticipated; therefore the program was intensified and methods were improved. Between 1925 and 1936 the total bed capacity at the county sanatorium reached 750 (60 of these beds were for children with primary tuberculosis and therefore did not assist in controlling contagion). Thus many more contagious cases could be isolated than in the previous decade. The Lymanhurst School and Health Center abandoned its treatment division for children with primary tuberculosis and concentrated its efforts on epidemiology. Large numbers of school children were tested with tuberculin, and the sources of the reactors' infections were sought among their adult associates. Many contacts of contagious cases were examined periodically. During this period all of the eighty-seven counties were accredited, so that by 1935 the state was designated a modified accredited area with reference to tuberculosis in cattle. By 1936 the tuberculosis mortality had dropped to 34 per hundred thousand (170 deaths). Thus, during this decade the number of tubercle bacilli which might be ingested or inhaled by children presumably was much decreased.

In 1936 we were desirous of obtaining tangible evidence [4] of the success of the methods employed during the past decade. Therefore we administered the tuberculin test to the children in the same schools as in 1926. The incidence of the first infection type of tuberculosis, as manifested by the intracutaneous test (Mantoux), ranged from approximately 14 per cent at the age of 6 to 26 per cent at the age of 14 years (chart 1) with an average of 18.9 (chart 2).

4. Harrington, F. E.; Myers, J. A., and Levine, N. M.: Significance of the Tuberculin Test, J. A. M. A. **108**: 1309 (April 17) 1937.

While approximately 1 of each 2 children had primary tuberculosis in 1926, it was present in only 1 in each 5 in 1936; thus, the potentialities of clinical tuberculosis during adulthood were definitely decreased.

Although the result of testing in 1936 denoted good progress in tuberculosis control, the situation was still far from satisfactory. Therefore the program was again intensified. Between 1936 and 1944 many patients with contagious and precontagious pulmonary tuberculosis were admitted to the sanatorium. The public had become so tuberculosis conscious that large numbers of apparently healthy persons were examined. Collapse therapy was employed extensively; in fact, one general hospital had set aside a division for chest surgery, and many patients with minimal and early moderately advanced tuberculosis were treated with ambulatory artificial pneumothorax, which prevented a sizable number from becoming contagious and converted others from the contagious to the noncontagious stage. The Minneapolis General Hospital had established a special chest disease service which was used as a clearing house for persons with pulmonary lesions suspected of being tuberculous. Those found to be in need of treatment for this disease were advised to transfer to the sanatorium. An advance step taken during this period consisted in quarantining incorrigible contagious cases. They were apprehended by the police department when necessary and committed to the sanatorium for as long as was deemed necessary by the commissioner of health and the sanatorium staff.

The testing of cattle throughout the state continued and the reactors, the total number of which was small, were killed. This was true also in adjacent states which might transport dairy products to the city; therefore it became extremely rare for a child or an adult to be infected with the bovine type of tubercle bacillus. In 1942, when the population of the city was 492,370, the tuberculosis mortality had dropped to 23 per hundred thousand (116 deaths).

In 1944 we were again desirous of obtaining tangible evidence of the results of the work. Therefore we tested the children in the same grade schools as in 1926 and 1936, with the result that among the 6,668 so tested the incidence of infection ranged from 2.1 per cent at 6 years to 12.5 per cent at 14 years (chart 1), with an average of 7.7 (chart 2). Thus, only one in each thirteen children was found to be a potential case of clinical tuberculosis in adult life. While this is a worth while accomplishment, we still have a significant tuberculosis problem among school children. Indeed, there will be a problem as long as a single child reacts to tuberculin; therefore the control measures must be increased and further intensified.

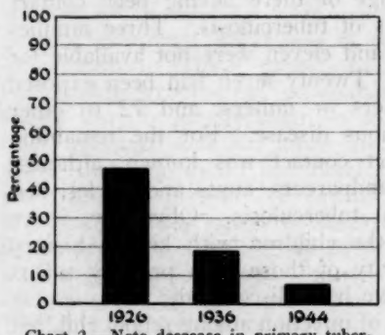

Chart 2.—Note decrease in primary tuberculosis (tuberculous infection) among children in the same grade schools between 1926 and 1944.

As the work progressed we deviated in several respects from the conventional method of administration of the tuberculin test. For example, in 1926 and 1936 the platinum needles were flamed after each test was administered. In 1944 the needles were not flamed

except when they came in contact with something other than the cleansed skin of the children. In no case was skin infection observed. This method doubles one's capacity for work, as it requires as long to flame the needle as it does to administer the tuberculin.

In 1926 and 1936 we used 0.1 mg. of tuberculin for the initial test. Those who did not react were given 1.0 mg. However, we are convinced that in areas where the incidence of tuberculous infection is low a milligram of tuberculin is a safe initial dose. We have employed this dosage in other work for a number of years. Therefore in 1944 the children in this study received a single test dose, consisting of 1.0 mg. No child reacted to a 4 plus degree, and we saw no more 3 plus reactions than had previously occurred when the 0.1 mg. dose was employed. The omission of the conventional first dose reduced the time consumption by about one half, as the second dose would have been necessary in approximately 95 per cent of our children.

All testing was done by one physician in order to insure uniformity of administration. From four hundred to five hundred tests were administered per hour. The same physician made the interpretation at the end of seventy-two hours, a procedure strongly recommended by the Committee on Tuberculosis of the Minnesota State Medical Association. This is far better than the usual forty-eight hour interval, because such conditions as mild hyperemia resulting from trauma have usually disappeared within seventy-two hours, whereas characteristic tuberculin reactions (induration or edema of 5 mm. or more in diameter) are still present and can be read as well even at ninety-six hours.

As tuberculosis is a contagious disease, obviously every child who reacts to tuberculin has been in contact directly or indirectly with a person or an animal that is disseminating tubercle bacilli. The source of the infection is often unknown to the reactor because many persons with clinical tuberculosis are contagious long before they are aware of the presence of their disease. Even among persons ill from tuberculosis rarely do more than 50 per cent know of the source of their original infection. Among the 512 children in our 1944 study who reacted to tuberculin the families of 385 had no knowledge of there having been contact with contagious cases of tuberculosis. Three families refused information, and eleven were not available for history of exposure. Twenty-seven had been exposed to tuberculous mothers or fathers, and 72 to other persons with contagious disease. For the remaining 14 children no direct contact was known, although relatives, such as grandparents, aunts and uncles, had suffered from clinical tuberculosis. Obviously, if we had examined only the children with known history of contact the majority of those with primary tuberculosis would not have been discovered.

Seeking the source of infection among school children who react to tuberculin is a potent case finding method wherever the incidence of tuberculosis is low. We have practiced this procedure a great deal and have found it fruitful; therefore it was strongly recommended that the adult members of the families of the 385 children who had no knowledge of contact with contagious cases be examined, as well as other close adult associates. This phase of the work has only begun, but its effectiveness is illustrated by the following: A girl in the third grade reacted to tuberculin but the x-ray films of her chest were clear. There was no known exposure. Examination of the parents revealed moderately advanced bilateral pulmonary tuberculosis in the father. His throat clearings contained numerous tubercle bacilli. At this time he was a university instructor with no knowledge of the presence of tuberculosis.

Chronic reinfection type of pulmonary tuberculosis is a disease of adulthood, both among human beings and among domestic animals. For example, Chadwick [5] reported that in the examination of large numbers of grade school children he found only 1 child in each 3,300 examined to have the reinfection type of pulmonary tuberculosis. In our studies at Lymanhurst we found only 1 such child in each 2,016 examined.[6] Many years ago, because of the rarity of this condition we discontinued making periodic x-ray films of the chests of the tuberculin reactors until they attained early adulthood. However, all children when first found to react to tuberculin should have one x-ray film inspection of the chest, as this may lead to detection of nontuberculous disease of the lungs and pleura as well as abnormalities of the cardiac outline. For this reason we recommended such inspection of the chests of the reactors. This was done also because among those of 12 years or older there is the possibility of finding an occasional chronic reinfection type of lesion which has attained sufficient size and consistency to cast a shadow visible to the unaided eye. It also provided an opportunity to emphasize that those who are already young adults and all others, as soon as they reach this period, should have annual examination, always including x-ray film inspection of the chest.

The families were advised to consult their private physicians for x-ray films of the reactors. In the event of inability to afford such service they were referred to a chest clinic. Among the 512 reactors there were 5 refusals, and 6 had moved and were not located. Two consulted physicans who advised against use of the x-rays, and 4 had fluoroscopies, as recommended by their physicians. Of the remaining 495 children the films were clear in 421. There was evidence of calcium deposits in 68, pleural adhesions in 4, bronchiectasis in 1 and pneumonia in 1. As was anticipated, no child presented evidence of lesions which might represent the reinfection type of chronic pulmonary tuberculosis. However, each of the 512 reactors is a potential case of this type of disease.

The finding of evidence of calcium deposits by x-ray has no significant meaning. The enthusiasm often manifested concerning evidence of calcium in the parenchyma, hilus or both, including some of our own previous writings, is, in our present opinion, "much ado about nothing." Postmortem findings by pathologists compared with x-ray evidence, both ante mortem and post mortem, even with the lungs removed and inflated, have shown that in only a relatively small number of persons in whom calcium deposits are actually present is there any evidence of its existence by x-ray inspection. Miller [7] found that "calcification of tuberculous first infection in the thorax is demonstrable roentgenographically in only about one fourth of the existing cases." Sweany [8] has shown that only about 20 per cent of the primary tuberculous infections in the chest

5. Chadwick, H. D.: The Massachusetts School Tuberculosis Clinic Program in Retrospect and in Prospect, School Physicians Bull., June 1935.
6. Myers, J. A.: The Latent or Smoldering Stages in Tuberculosis, Am. Rev. Tuberc. **36**: 355, 1937.
7. Miller, G. R.: The Recognition of Thoracic Calcification, Am. J. Roentgenol. **26**: 191, 1931.
8. Sweany, H. C.: Studies on the Pathogenesis of Primary Tuberculous Infection: I. The Regressive Lesions, Am. Rev. Tuberc. **27**: 559, 1933.

are detected by x-ray. Therefore, if one was to require x-ray evidence of calcification before making a diagnosis of primary tuberculosis, even if all calcification were due to this disease, one would miss 75 to 80 per cent of the cases.

The presence of x-ray evidence of calcium does not necessarily denote a healed lesion. Calcium is deposited in dead material, and at the same time disease may be present in adjacent living tissue which is not demonstrable by x-ray. The deposition of calcium does not indicate specificity for any disease; indeed, there are many nontuberculous conditions in which it is deposited. As many as 5 to 25 per cent of lesions which by x-ray were thought to represent primary tuberculous lesions have been found at postmortem to be nontuberculous. Therefore, if instead of testing the entire 6,668 children with tuberculin in 1944 we had just made x-ray film inspections of their chests, in only 68 of the 495 with primary tuberculosis would there have been sufficient evidence to suspect its presence. Thus, the remaining 427 children and their families would have been given a false sense of security with reference to the future potentialities pertaining to clinical tuberculosis, as they would have been told that they were free from tuberculosis. By the method employed we detected 512 actual cases of tuberculosis (we do not use "tuberculosis" synonymously with consumption) in some phase of its development. It is certain that some of the lesions already present, together with the accompanying allergy, will be responsible for the development of clinical tuberculosis at a later time. In what percentage this will occur we do not know, but our experience [9] in dealing with tuberculosis among children and adults for approximately twenty-five years, together with Bogen's careful analysis of the toll of tuberculous infection, has taught us that enough of the reactors develop clinical tuberculosis in later life so that it is extremely important to examine every adult periodically who reacts to tuberculin.

In 1939 Stewart [10] determined the infection attack rate to be approximately 1 per cent annually among Minneapolis children. Apparently this has decreased considerably; in fact, among the children of 6 years tested in 1944 the rate was one third of 1 per cent. The local health department,[11] the tuberculosis association and the medical society tested 7,518 junior and senior high school students in 1942 and 1943, and 941 (12.5 per cent) reacted.

The opposite extreme has been reported from Cincinnati,[12] where 3,622 high school students voluntarily had x-ray film inspections of their chests, and "from the x-ray findings 82.5 per cent showed primary phase tuberculosis: 70.1 grade 1, 10.2 grade 2 and 2.26 grade 3." This report, if the interpretations are correct, indicates an extremely serious situation among the children of Cincinnati. Indeed, the figures would indicate that this city is in a predicament no less serious than that of Vienna reported by Pirquet [13] in 1907. However, the situation may not be as bad as it appears, since the diagnoses were made entirely from x-ray shadows, which are never specific. Of all the phases of an examination there are only two which are specific —the tuberculin reaction and recovery of tubercle bacilli. Without at least one, diagnosis of tuberculosis in any phase is never justified.

Among 8,993 Minneapolis high school students who had 35 by 35 millimeter photofluorograms of the chest, approximately 1 in 1,500 had shadows which were thought to be due to the reinfection type of pulmonary tuberculosis. Among 3,622 Cincinnati high school students who had 4 by 10 inch photofluorograms, only 2 had such shadows. Concerning both of these studies the following statement was made: "It would seem that the high school is not the place to find tuberculosis." Evidently the word "tuberculosis" is used synonymously with consumption or gross lesions and if one is satisfied to postpone finding tuberculosis until it has reached such proportions the statement is correct. This seems paradoxical, however, at a time when so much is being said about finding the disease early and when the tuberculin test reveals its presence within three to seven weeks after focalization of bacilli. In reality, among 7,518 Minneapolis students tested 941 had tuberculosis in the strict sense of the word.

The invention of the stethoscope and the discovery of the tubercle bacillus were hailed with much enthusiasm, but both proved to be helpful in diagnosis usually after the disease is extensive. The x-ray film inspection of the chest is now in the limelight because it often detects shadows of lesions before they cause symptoms. However, enthusiasm for the x-ray is beginning to wane with the stark realization that it too is a method for locating areas of gross disease and therefore is not the earliest possible diagnostic procedure. However, it is the best we have to detect the location of reinfection type of lesions after they become macroscopic and are located in parts of the lung which are visualized on the film.

Among adult tuberculin reactors are those destined to develop chronic reinfection type lesions, and the most important step is to find these lesions while they are early and before they have caused illness or have become contagious. For almost a quarter of a century in the Tuberculosis Service of the Minneapolis Division of Health (formerly Lymanhurst) we have studied the various methods of detecting early lesions.[9] At first stereoscopic x-ray films were made of the chests of all persons examined, regardless of reaction to tuberculin or symptoms. These inspections were made annually for sizable groups of individuals. In some whose chests were originally clear on x-ray inspection there later appeared one or more areas with changes so slight that one could not determine whether lesions were actually present. Frequent periodic inspections in some of these cases, however, left no question as to the presence of lesions which slowly produced larger and larger shadows, and ultimately by other methods the majority of them were found to be tuberculous. Not all early demonstrable lesions are minimal. Occasionally the person whose film is clear may within three to six months have evidence of advanced disease.

On analysis we discovered that all persons who developed chronic tuberculous lesions under our eyes came from the group of tuberculin reactors. Moreover, these lesions usually did not become visible except in adulthood. Therefore we discontinued making films of the chests of nonreactors to tuberculin in all age periods because it seemed futile to be looking for something that could not possibly exist by reason of absence of tubercle bacilli. Of all the methods used we came

9. Harrington, F. E., in The Evolution of Tuberculosis as Observed During Twenty Years at Lymanhurst, Minneapolis, 1921-1941, Minneapolis, Journal-Lancet, 1944.
10. Stewart, C. A.; Harrington, F. E.; Myers, J. A.; Boynton, R. E.; Chiu, P. T. Y., and Streukens, T. L.: Primary Tuberculous Infection Attack Rates, J. A. M. A. **113**: 2204 (Dec. 16) 1939.
11. Report on High School Tuberculosis Survey, Hennepin County Tuberculosis Association, 1944.
12. Wilzbach, C. A.: Physical Fitness Program: A Report of Medical and Dental Examinations of 5,620 Senior and Junior High School Students, J. A. M. A. **125**: 828 (July 22) 1944.
13. Pirquet, Clemens: Demonstration zur Tuberkulindiagnose durch Hautimpfung, Berl. klin. Wchnschr. **44**: 699, 1907; Frequency of Tuberculosis in Childhood, J. A. M. A. **52**: 675 (Feb. 27) 1909.

to the conclusion that the only one which is scientific, accurate and wholly satisfactory for discovering the early chronic tuberculous lesion is that which makes annual x-ray inspections of the chests of adult tuberculin reactors, with complete examination of those with lesions which cast shadows.

The medical profession is seriously in need of a criterion by which one can determine whether a given tuberculin reactor will ever develop clinical tuberculosis. However, its realization seems most remote, since the evolution of clinical disease depends on several factors: 1. An infection that is definitely present today may completely disappear over a period of months or years; that is, all the tubercle bacilli in the lesions die. 2. Reinfections from exogenous sources may or may not occur. 3. The walls which nature establishes around the tubercle bacilli in the lesions of primary complexes may serve as permanent prisons for the organisms. On the other hand, they may be resorbed or trauma may rupture them so that the tubercle bacilli are liberated, to find lodgment on allergic tissue (endogenous reinfection). Since such a criterion probably is not possible, it would be helpful if one was available to determine when an individual begins to develop the reinfection type of tuberculosis; that is, when the disease is in the preclinical stage and before it has attained such gross proportion as to cast x-ray shadows. Caulfeild,[14] Ogden[15] and others believe such a diagnostic agent is now available in the Caulfeild inhibitive reaction and the tuberculin complement fixation test.

In most parts of the world at present the children constitute the only group over which one can exercise complete tuberculosis control. The child is born free from tubercle bacilli, and if his environment is adequately guarded his body will remain uncontaminated with these organisms. This necessitates complete examination of all who are to be his adult associates to find (1) those who already have clinical tuberculosis and (2) those who react to tuberculin and are potential cases of such disease. Those who on first or subsequent examination are found to have clinical tuberculosis must be kept from the child's environment unless it can be proved continuously that their disease is not contagious. The child himself should be tested periodically to make sure that no unsuspected contagious case among transients and the like has come into his environment and infected him. This procedure should not be limited to childhood but should be continued when adulthood is attained. This is not a theoretical consideration of idealists. It is actually in practice with a high degree of success and must be the ultimate goal in every home and community.

14. Caulfeild, A. H. W.: The Tuberculo-Complement-Fixation and Inhibitive Tests, Am. Rev. Tuberc. **11**: 508, 1925.
15. Ogden, W.: The Abolition of Clinical Tuberculosis by Anticipation and Control, Canad. M. A. J. **40**: 253, 1939.

Science and War.—But science is our consolation and refuge; today every nation respects it: in the midst of the tumult of war the descendants of Archimedes among us have nothing to fear from an enlightened soldiery, to whom their names and their work are known and who are happy to become for the moment their disciples. Perhaps it is actually in the most terrible times that, taking refuge in the cloisters of meditation, shunning in the exaltation of their spirit the horrors that surround them, they sometimes attain the most fortunate conclusions, the most fruitful discoveries. We shall see that the list of accomplishments for this year yields nothing to those of our most peaceful years.—Olmsted, J. M. D.: François Magendie, New York, Schuman's, 1944.

PENICILLIN AND SULFONAMIDES IN THE THERAPY OF ACTINOMYCOSIS

REPORT OF SIXTEEN ADDITIONAL CASES AND IN VITRO TESTS OF SUSCEPTIBILITY OF ACTINOMYCES TO PENICILLIN AND SULFADIAZINE

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In 1941 we[1] reported 3 cases of actinomycosis successfully treated with sulfanilamide. Since then we have collected 16 additional cases treated in the Stanford medical, pediatric and surgical services at Stanford-Lane Hospitals, at the San Francisco Hospital and as private patients. These cases of actinomycosis include 3 of the pulmonary, 2 of the abdominal and 11 of the cervicofacial types.

In the last three years a number of articles have reported the use of sulfonamides in the treatment of actinomycosis.[2] The opinions expressed in general have been that the sulfonamides are of great value. Not only the cervicofacial types but also extensive abdominal and pulmonary types have been cured, or at least arrested, for long periods of time after the use of sulfonamides.

Penicillin has been used for too short a time to draw final conclusions as to its efficacy in treating actinomycosis. Herrell, Nichols and Heilman[3] reported the use of penicillin in 12 cases of actimomycosis. There was failure in 2 cases, a satisfactory result in 2 and a doubtful result in 8. These authors plan to give a detailed report at a later date. Other reports on the use of penicillin in the treatment of actinomycosis[4] deal with small numbers of cases, most of which have been followed for short periods of time. The general impression gained is that penicillin is an effective agent in treating actinomycosis. Several failures, however, have been reported.

Our purpose in the present paper is to compare the effectiveness of penicillin and the sulfonamides in the

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Part of the penicillin was provided by the Office of Scientific Research and Development from supplies assigned by the Committee on Medical Research for clinical investigations recommended by the Committee on Chemotherapeutics and Other Agents of the National Research Council.

1. Dobson, L.; Holman, E., and Cutting, W.: Sulfanilamide in the Therapy of Actinomycosis, J. A. M. A. **116**: 272-275 (Jan. 25) 1941.
2. Wilkinson, E. E.: Actinomycosis Treated with Sulfanilamide, J. Pediat. **18**: 805-810 (June) 1941. Lyons, C.; Owen, C. R., and Ayers, W. B.: Sulfonamide Therapy in Actinomycotic Infections, Surgery **14**: 99-104 (July) 1943. Ladd, W. E., and Bill, A. H., Jr.: Actinomycosis of the Chest with Spread to the Abdomen: Report of a Case Cured with Sulfadiazine, New England J. Med. **229**: 748-750 (Nov. 11) 1943. Hollenbeck, W. F., and Turnoff, D.: Actinomycosis Treated with Sulfadiazine, J. A. M. A. **123**: 1115-1117 (Dec. 25) 1943. Pillsbury, N. R., and Wassersug, J. D.: Pulmonary Actinomycosis: Treatment with Sulfonamides, New England J. Med. **230**: 72-74 (Jan. 20) 1944. Benbow, E. P., Jr.; Smith, D. T., and Grimson, K. S.: Sulfonamide Therapy in Actinomycosis, Am. Rev. Tuberc. **49**: 395-407 (May) 1944.
3. Herrell, W. E.; Nichols, D. R., and Heilman, D. H.: Penicillin: Its Usefulness, Limitations, Diffusion and Detection, with Analysis of 150 Cases in Which It Was Employed, J. A. M. A. **125**: 1003-1011 (Aug. 12) 1944.
4. These include:
Herrell, W. E., and Nichols, D. R.: The Calcium Salt of Penicillin, Proc. Staff Meet., Mayo Clin. **18**: 313 (Sept. 8) 1943.
Lyons, C.: Penicillin Therapy of Surgical Infections in the United States Army, J. A. M. A. **123**: 1007-1019 (Dec. 18) 1943.
Herrell, W. E.: The Clinical Use of Penicillin, ibid. **124**: 622-627 (March 4) 1944.
Christie, R. V., and Garrod, L. P.: A Review of the Work of a Penicillin Research Institute, Brit. M. J. **1**: 513-515 (April 15) 1944.
Wollgast, C. F.: The Clinical Use of Penicillin: A Report of 115 Cases Treated in an Army Hospital, Texas State J. Med. **40**: 225-231 (Aug.) 1944.
Altemeier, W. A.: Penicillin in Surgery, South. M. J. **37**: 494-507 (Sept.) 1944.
Herrell, Nichols and Heilman.[3]

treatment of actinomycosis. Like Herrell and his associates, we feel that no final conclusions should be drawn with less than an eighteen month follow-up period. However, the sulfonamides and penicillin proved so effectual in most of our cases that we are reporting them to encourage others to use these drugs in order that a larger series of cases may be accumulated from which definite conclusions may be drawn. In addition to the study of the 16 cases of actinomycosis, various concentrations of penicillin and sulfadiazine were observed for their effects on different strains of Actinomyces in vitro.

REPORT OF CASES

Table 1 summarizes the case reports, listing the type of case, the drug or drugs used and the end result. Three cases were treated with penicillin alone, 3 with penicillin and sulfadiazine, 6 with sulfadiazine, 1 with sulfadiazine and sulfathiazole, 1 with sulfathiazole and 2 with sulfanilamide.

CASE 1.—G. R. F., a man aged 37, noticed a swelling on the left side of his neck three months before entry. This was compressed and then lanced and Actinomyces organisms were demonstrated in the pus. He was then treated by roentgen irradiation, ten doses of 200 roentgens, after which the swelling became nodular. Potassium iodide also was given for two weeks.

On admission to the penicillin ward in Stanford Hospital on March 15, 1944, examination was not remarkable except for an indurated swelling at the angle of the left jaw, from which yellow pus could be expressed in several places (fig. 1).

During the first six days after hospitalization he was treated with penicillin by continuous intravenous drip, the total dosage being 1,030,000 units. During the next thirty-two days he was given 120,000 units daily by three hourly intramuscular injections, so that the total by all routes was 4,655,000 units. He improved steadily, and only a few minimal nodules, without secretion, remained when he was dismissed. During the following month a mild discharge occurred on two occasions from the flattened nodules, but, in general, these decreased in size. Eight months after leaving the hospital he remained entirely well with no induration or swelling of the originally involved area (fig. 2).

This patient had an extensive cervicofacial type of actinomycosis. During a three months period the infection continued to spread in spite of iodide and roentgen therapy. A rapid and apparently complete healing occurred after the administration of 4,655,000 units of penicillin.

CASE 2.—M. M., a man aged 38, had had swellings over the left cheek and beneath the left ear for five months when he was first seen at Stanford Hospital. Occasionally the swellings broke down and discharged pus. He had had several teeth extracted and was given a one week course of sulfonamide therapy, all without any lasting benefit.

On admission to the penicillin ward on May 22, 1944 he was afebrile, with a crusted lesion on the left cheek near the ear and a tender swelling 6 cm. in diameter over the left malar bone. There was pus draining into the left auditory canal through a fistula in the upper wall. Examination was not otherwise remarkable except for expression of pus from the lesion, which contained the organisms of actinomycosis.

He was treated by intramuscular injections of penicillin at three hour intervals. During the first three days the daily dosage was 200,000 units, the next five days it was 120,000 units and the remaining nine days of treatment it was 40,000 units. The total dose during the seventeen days was 1,560,000 units. Healing was remarkably rapid, and no evidence of the lesion was apparent at the conclusion of treatment.

Rapid healing occurred in this case of cervicofacial actinomycosis of five months' duration by the administration of 1,560,000 units of penicillin over a seventeen day period.

CASE 3.—J. G., a man aged 56, a shipyard worker, entered the medical service of Lane Hospital on Aug. 21, 1944 complaining of fever and a severe cough. Four months previously he had started to lose weight. A chronic cough became much worse and he was hospitalized as a private patient and was given sulfadiazine for one month and penicillin for eight days. He improved and returned home feeling better. A week later, however, he developed a tender swelling in the right flank, and his local physician drained an abscess in the right lumbar region.

On entry he had a fever of 39.5 C. (103.1 F.) and there were numerous rales over both sides of his chest. X-ray examination showed scattered densities in both lung fields with encapsulated fluid in the right lower chest. The right psoas muscle shadow was obscured and the entire retroperitoneal area appeared cloudy. Thin yellow fluid drained from the right flank incision. On September 1 typical sulfur granules of actinomycosis were identified in the drainage. All cultures were heavily overgrown with Staphylococcus aureus, but the fungi were not isolated.

TABLE 1.—*Summary of Case Reports*

Case	Type	End Results
Penicillin		
1. Mr. G. R. F.	Cervicofacial	Cured
2. Mr. M. M.	Cervicofacial	Arrested
3. Mr. J. G.	Pulmonary	Arrested
Penicillin and Sulfadiazine		
4. Mr. A. D.	Cervicofacial	Arrested (alternate course)
5. Mr. J. McB.	Cervicofacial	Arrested (combined)
6. Mr. G. W.	Pulmonary	Arrested (alternate courses)
Sulfadiazine		
7. Mr D. P.	Cervicofacial	Cured
8. Mr. A. L.	Cervicofacial	Cured
9. Mrs. C. R.	Cervicofacial	Cured
10. Mrs. J. P.	Cervicofacial	Arrested
11. Mrs. I. B.	Abdominal	Arrested, 14 months
12. Mr. F. B.	Pulmonary	(Short course) (died)
Sulfadiazine and Sulfathiazole		
13. Miss M. M.	Cervicofacial	Cured
Sulfathiazole		
14. Mrs. M. W.	Abdominal	(Died)
Sulfanilamide		
15. Miss H. M.	Cervicofacial	Cured
16. Mr. D. M.	Cervicofacial	Cured

Cured: Followed for 6 months to 4 years after all therapy was stopped.
Arrested: No evidence of active disease, but there was too short a follow-up period to claim a cure.

He was started on penicillin on September 4, receiving 200,000 units daily intramuscularly. On September 21 the daily dose was reduced to 120,000 units. By October 11 he had received 4,300,000 units. The sinus was healed by September 26. The temperature became normal and remained so after the first week of treatment. On September 28 roentgenograms showed improvement in both lungs. On October 9 both lungs were practically clear on physical examination.

He was dismissed on October 13, and examinations in the outpatient clinic have shown that he was gaining weight and was without cough or fever, and that the chest remained clear.

Penicillin produced a prompt and decided improvement in this patient's pulmonary and retroperitoneal actinomycosis. He cannot be considered cured and will be closely followed. This case also illustrates the usual difficulty in establishing the diagnosis of actinomycosis until sulfur granules are found in the pus.

CASE 4.—A. D., a man aged 46, Spanish, a cleaning establishment operator, entered the San Francisco Hospital on April 9, 1944 complaining of a painful swelling on the right side of his neck. Three weeks previously he had had an upper respiratory infection complicated by a sore throat. An abscess formed, which broke spontaneously into his throat. The day before

admission a painful swelling developed in the upper right side of his neck. Examination showed a hard swelling of the right neck from the angle of the jaw to 4 cm. above the clavicle. The right tonsil was pushed forward and the uvula was displaced to the left. He was considered to have a peritonsillar

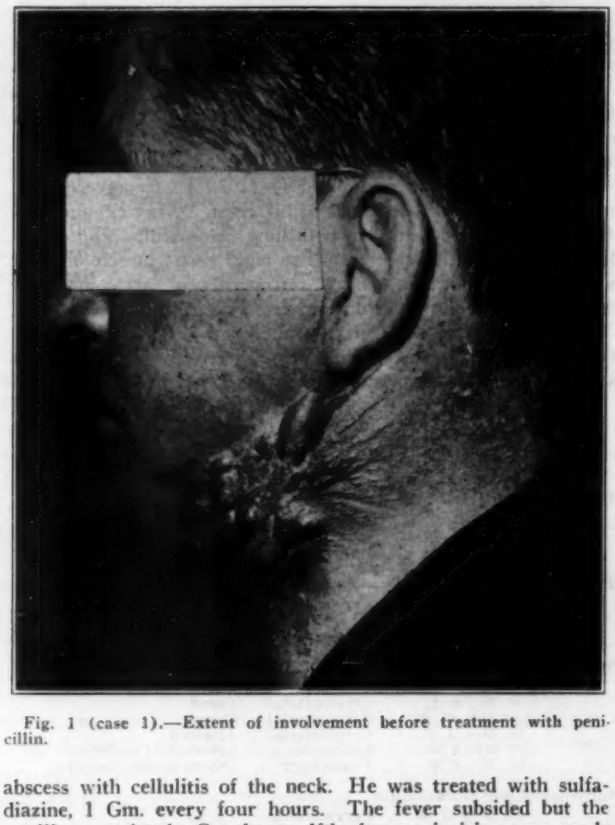

Fig. 1 (case 1).—Extent of involvement before treatment with penicillin.

abscess with cellulitis of the neck. He was treated with sulfadiazine, 1 Gm. every four hours. The fever subsided but the swelling persisted. On the twelfth day an incision was made below his right jaw and only indurated tissue encountered. Microscopic examination did not show Actinomyces. On May 5 dental roentgenograms showed extensive bony destruction around the roots of the right lower third molar. On May 9 the lower three molars were extracted. On May 25 a fluctuant abscess at the right angle of the jaw yielded thick yellow pus containing granules typical of Actinomyces bovis. These were identified on repeated examinations, although the organisms failed to grow on culture. On May 26 the sulfadiazine was stopped after administration of a total of 294 Gm. and the patient was started on penicillin 15,000 units intramuscularly every three hours (120,000 units daily). Within two days after starting the penicillin his condition showed much improvement. The swelling rapidly subsided and the drainage decreased until by June 22 it had ceased. He was discharged on June 28 with only a slight soft swelling below the angle of his jaw. He received a total of 4 million units of penicillin.

This case illustrates the difficulties of establishing an early diagnosis of actinomycosis, even when it is suspected and repeated examinations are made to find the organism. The patient improved on sulfadiazine but the infection became stationary. The infection rapidly subsided with the administration of 4,000,000 units of penicillin. The bony involvement made necessary the intensive and more protracted course of therapy.

Case 5.—J. McB., a man aged 41, a cook, developed a painless swelling in the right temple on Dec. 15, 1943. On December 26 he had two lower right molar teeth extracted, but the swelling continued to increase. He was brought to Stanford Hospital on Jan. 7, 1944, at which time he had a large fluctuant swelling in the right temple and an indurated swelling of the right side of his face extending down to the angle of the jaw. The abscess was drained of 50 cc. of thick yellow-gray pus. Actinomyces organisms were obtained on smear and subsequently identified on culture. Treatment with 1 Gm. of sulfadiazine every four hours led to rapid improvement. He was dismissed on January 12 and kept on full dosage of sulfadiazine at home. By March 3 the incisions had healed and the swelling had disappeared. The sulfadiazine was discontinued on March 3, but three weeks later the swelling in the right temple recurred and he was again given full dosage of sulfadiazine. On April 3 roentgen therapy and potassium iodide were started. In spite of the combined therapy of sulfadiazine, x-rays and iodide, the firm swelling in the right temple persisted and he began to have more difficulty in opening his mouth. A roentgenogram of the facial bones showed an area of bony destruction in the maxillary process of the right malar bone and an obscure right maxillary sinus.

On readmission May 19 to the penicillin ward he was started on 15,000 units of penicillin intramuscularly every three hours, a total of 120,000 units daily. By June 12 a total of 3,000,000 units had been administered. The swelling diminished and became softer and he could open his jaw better. He left the hospital on June 13, but by June 21 the swelling had started to increase again. Roentgenograms, however, showed healing of the malar bone. He was readmitted to the penicillin ward and started on June 29 again with 120,000 units of penicillin daily, continuing to July 23 to a total of another 3,000,000 units. As the penicillin therapy produced no definite improvement, treatment with sulfadiazine, 1 Gm. every four hours, was started on July 15. Under the combined therapy of penicillin and

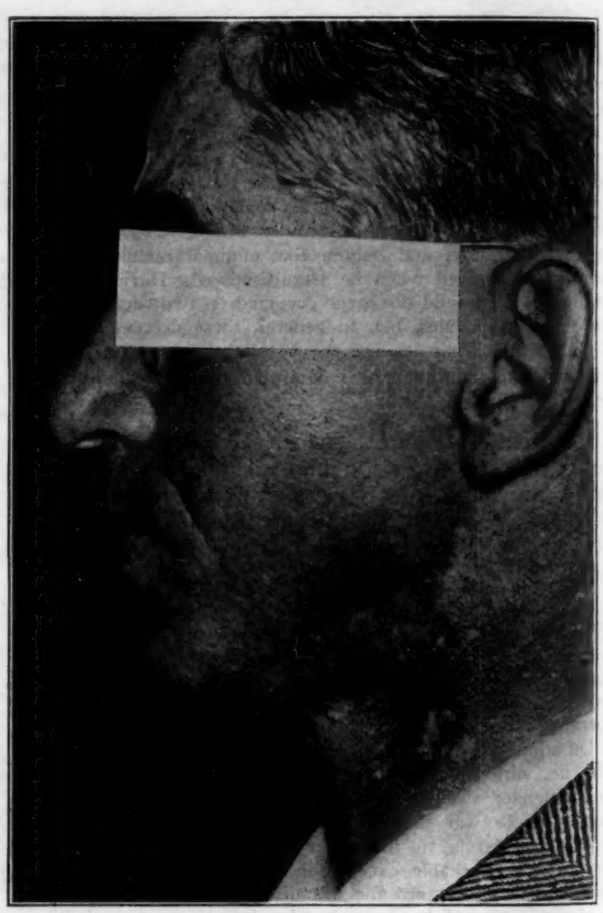

Fig. 2 (case 1).—Seven months after treatment with penicillin.

sulfadiazine the patient slowly improved, but there was still some swelling in the right temple on dismissal from the hospital on July 24. He was continued on 1 Gm. of sulfadiazine every four hours for one month and then given 1 Gm. every six hours for four months. The swelling disappeared and he has been free from symptoms for the past three months and working the past four months.

As in case 4, this illustrates the greater difficulty in obtaining a cure when there is extensive bony involvement. This proved the most difficult to control of the 11 cases of cervicofacial actinomycosis in this series. The patient was treated with sulfadiazine for seven months and received 6,000,000 units of penicillin in addition to surgical drainage, potassium iodide and roentgen therapy. A longer period of observation is necessary, before he can be considered cured.

Fig. 3 (case 6).—Appearance of chest on July 31, 1943, showing the massive pleural empyema.

CASE 6.—G. W., a man aged 39, a railroad switchman, entered the San Francisco Hospital on July 29, 1943 complaining of pain in the left side of his chest. He was an alcoholic addict. For fourteen months he had had a chronic cough which produced a cupful of sputum daily. Three weeks prior to entry he suddenly developed a pleuritic pain in the left side of the chest, which gradually became a steady, dull ache under the left scapula and along the left costal border and his dyspnea increased.

A massive pleural effusion (fig. 3) was found on admission. On July 31 750 cc. of purulent fluid was withdrawn from his left chest. Culture showed Actinomyces, but the exact strain was never identified. On August 6 an Eloesser flap was made in the left chest and 5,000 cc. of pus evacuated (figure 4 gives the appearance of the chest after drainage). Sulfadiazine was started on August 19, 1 Gm. every six hours. Lugol's solution was given also and the dosage gradually increased until he was receiving 33 drops three times daily by September 2. He also received ten roentgen radiation treatments of 100 roentgen units each to the left chest.

He improved rapidly and gained weight. The drainage from the left chest rapidly diminished. A roentgenogram of the chest on November 24 showed definite clearing of the density in the left lung field. He was discharged from the hospital on Nov. 26, 1943.

Fig. 4 (case 6).—Chest on Sept. 14, 1943, showing extent of involvement of left lung after pleural drainage.

Shortly after leaving the hospital he developed a severe upper respiratory infection, with a cough and an increase in drainage from the chest flap. He was readmitted on December 28, and on Feb. 9, 1944 again started on sulfadiazine, 1 Gm. five times daily to July 20. There was a slow general improvement but his sputum continued to contain Actinomyces granules. On August 11 he was started on a daily dose of 100,000 units of penicillin intramuscularly, which was decreased to 50,000 units daily on September 1. The penicillin was continued to October 28, a total of 5,000,000 units being given over the ten week period. At the time of his dismissal he was in excellent condition, without evidence of any pulmonary activity (figure 5 shows one of the latest chest films).

This patient had a chronic lung infection for fourteen months before he was brought to the hospital with a massive empyema. Organisms of the Actinomyces group were cultured from the empyema pus and repeatedly seen in granules in the sputum, but the exact species could not be identified. Surgical drainage and a nine week course of sulfadiazine produced definite improvement. A month after he left the hospital his cough and the drainage increased and he was readmitted. He was given sulfadiazine therapy for five months more and then 5 million units of penicillin. His case is considered arrested and he will be followed for an additional eighteen months before he can be considered cured.

CASE 7.—D. P.,[5] a man aged 30, a shipyard worker, developed a mass in the left submaxillary region in July 1943, six weeks after the extraction of a left lower molar tooth. During the next five weeks the mass increased in size, became fluctuant and finally ruptured through multiple sinuses. The pus contained Actinomyces bovis.

The fluctuant area was drained surgically and a 50 per cent suspension of sulfadiazine in isotonic solution of sodium chloride instilled three times a day. Sulfadiazine also was administered intravenously, and then orally, to maintain a concentration of 12 to 15 mg. per hundred cubic centimeters in the blood. Iodide and thymol also were administered. Within two weeks the lesions had literally disappeared. One week later the urine became grossly bloody and the sulfadiazine was stopped, but the iodide and thymol were continued and the lesion was given 1,200 roentgens in divided doses.

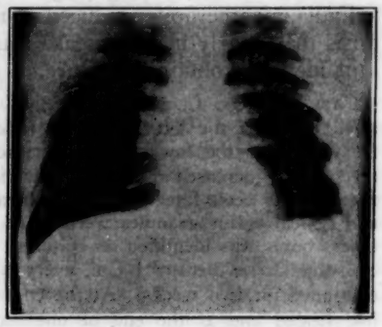

Fig. 5 (case 6).—Chest on May 1, 1944, showing pronounced clearing of the left lung base.

In spite of this adjunct therapy, the mass and sinuses recurred a month after sulfadiazine was stopped, involving a more extensive region than originally. Sulfadiazine was resumed intravenously and then orally in doses adequate to produce a blood concentration of 15 to 25 mg. per hundred cubic centimeters. This required 4 Gm. every four to six hours. Local treatment was carried out, as when first seen. Fluids were given in large amounts and 15 Gm. of sodium bicarbonate was administered, in divided doses, each day. No toxic symptoms developed despite the high dosage of sulfadiazine, and the lesions again disappeared rapidly. Within one month the lesions and incisions had been replaced with firm scar tissue, but the therapy with sulfadiazine was continued for three more months. By this time the scars and deep seated induration had become quite soft and pliable. At present the patient is at work, apparently completely cured.

It is obvious that treatment on the first occasion (three weeks) was inadequate and that the longer period (four months) was necessary to achieve complete cure. The recurrence and progression of the disease under iodide, thymol and roentgen irradiation are indicative of the low efficacy of these agents. The dose of sulfadiazine 4 Gm. every four to six hours is phenomenal but shows that these high doses and correspondingly high blood concentrations may be safe if the fluid intake is large and the urine is maintained on the alkaline side of neutrality.

5. The patient was seen through the courtesy of Dr. Irving Wiesen teld of the Permanente Hospital, Oakland, Calif.

CASE 8.—A. L., a man aged 42, a farmer and welder, was admitted to the San Francisco Hospital on April 1, 1944 for treatment of an abscess on the right side of his jaw. Two weeks previously he had first noticed that he could not open his mouth widely, and a small, painless swelling had appeared at the right angle of the mandible. The swelling increased in size and became painful. Within a week an abscess formed, which was drained at the Stanford Clinic. The pus contained typical granules of Actinomyces bovis.

Examination on admission showed a swelling of the right jaw extending from the zygoma to about an inch below the body of the mandible. The swelling was firm and not tender except over the angle of the jaw. The incision along the inferior surface of the mandible was draining thick creamy pus. A roentgenogram of the mandible showed a large abscess around the root of the right second molar. On the third day the patient's temperature rose to 104.4 F. Hot compresses were started and continued for three weeks. Treatment with sulfadiazine 1 Gm. every four hours was continued for nineteen days to the time of his discharge from the hospital. On April 15 the affected molar was extracted. Cultures from the tooth socket isolated organisms of the Actinomyces group, hemolytic Staphylococcus albus, and anaerobic, gas producing bacilli.

He improved rapidly, the swelling subsided and the drainage decreased. A 2 cm. area of induration at the angle of the jaw was still present when he was dismissed to outpatient care. Seven months later he still showed no evidence of recurrence.

Adequate surgical drainage and nineteen days of sulfadiazine therapy produced a rapid cure. A diagnosis made early in the disease was no doubt an important factor in obtaining a cure.

CASE 9.—Mrs. C. R.,[6] aged 58, a housewife, developed a swelling below the left jaw in the middle of November 1943. A week later the lower left canine tooth was extracted, but the swelling increased and spread down into the left submaxillary region. A week later a small submaxillary abscess drained and typical sulfur granules were found in the pus and Actinomyces bovis was identified on culture. The patient was started on sulfadiazine therapy 1 Gm. every four hours, and this was continued for two weeks. At the end of that time the incision had healed and at the end of one month all induration was gone. One year later there is no evidence of a recurrence.

A prompt complete healing of the cervicofacial actinomycosis occurred after drainage and two weeks of sulfadiazine therapy. There has been no recurrence in one year.

CASE 10.—Mrs. J. P., aged 25, developed a swelling along the border of the mandible seven weeks after the removal of a carious third lower molar tooth. Two weeks later (Nov. 19, 1943) the lesion was opened surgically and the organisms of actinomycosis were demonstrated in the pus. No osteomyelitis was demonstrated by roentgenograms.

Treatment was intermittent during the first month and consisted of about fourteen days of active therapy with sulfathiazole or sulfadiazine in doses of about 1 Gm. every four hours. Iodide was also taken irregularly during this time. After this she had continuous treatment with sulfadiazine 1 Gm. every four to six hours, together with adequate fluids and sodium bicarbonate to keep the urine dilute and alkaline. She was also given Strong Solution of Iodine, U. S. P., 10 to 20 drops three times a day. No x-ray therapy was administered. At the end of two months she stopped treatment entirely because she felt perfectly well. Two months later she reported by letter that she considered herself well and that the army medical officers where her husband was stationed considered her cured.

Drainage and sulfadiazine produced a rapid improvement and possible cure in this case. Inadequate follow-up prevents the case being listed as a cure.

6. Seen through the courtesy of Dr. Robert S. Irvine, Department of Ophthalmology, Stanford Medical School.

CASE 11.—Mrs. I. B., aged 41, a clerk, entered the surgical ward of Lane Hospital on Aug. 20, 1943 for treatment of a recurrent abscess on the right lower abdomen. In 1936 exploration for a ruptured appendix had been done. For the following six years she repeatedly developed abscesses in the right lower abdomen which were either drained by incision or ruptured spontaneously. Five days prior to admission the painful swelling recurred in the right lower quadrant. Examination showed a 10 cm. tender area of induration at McBurney's point.

On the day of admission a McBurney incision was made and an abscess drained, the pus containing typical sulfur granules. Sulfadiazine therapy was started, 1 Gm. every four hours. The patient was dismissed on the seventh day and continued on sulfadiazine at home, receiving a total of 125 Gm. of sulfadiazine in a three week period. The abdominal wound healed in three weeks. Examination on Dec. 6, 1944, fourteen months after drainage of the abscess, showed the abdomen to be soft and nontender.

Although more than fourteen months have passed since the last recurrence of the abdominal actinomycosis, the patient must be followed for another year before being pronounced cured. Without medication she has gone as long as ten months previously between recurrences. The relatively short course of sulfadiazine has arrested the infection for a long period and perhaps cured it.

CASE 12.—F. B.,[7] a man aged 63, a retired banker with severe diabetes, developed a productive cough in February 1943. He then began to have night sweats and soon lost weight and strength. From the sputum and from subcutaneous nodules a fungus was isolated, first called Streptothrix and later identified as Nocardia (Actinomyces) asteroides.

On four occasions he was given a week's course of sulfadiazine (1 Gm. every four hours), and during each of these periods he improved and his fever remitted. This therapy was not persisted in, however, and he slowly became weaker. He was transferred from the care of his private physician to the Stanford Medical Service on May 8, 1943.

Examination on admission showed that he was extremely ill and in great respiratory distress. There were multiple, firm, fluctuant nodules in the skin and subcutaneous tissues of the arm, chest and abdomen. Chest examination showed extensive bilateral pulmonary involvement. He failed to respond to sulfadiazine therapy and died on May 11.

Autopsy revealed numerous subcutaneous abscesses containing the fungus. Similar abscesses were found in the lungs, heart, kidneys, thyroid and psoas muscles.

In comparison with the successfully treated cases, the brief periods of treatment with sulfadiazine in this case seem highly inadequate. The immediate benefit from each course of sulfadiazine probably indicates that more prolonged therapy might have been curative.

CASE 13.—M. M., an Indian girl aged 9 years, was admitted to the pediatric service of Stanford-Lane Hospitals on Feb. 7, 1942 for treatment of a swelling of the right side of the face. The swelling was first noticed two months previously over the right angle of the jaw. On entry, physical examination revealed a swelling at the angle of the right mandible with a small superficial abscess over it and some purulent drainage at the base of the second right molar. Roentgenograms on Feb. 7, 1942 showed bony destruction and new bone formation involving about half of the right mandible. On February 9 pus from a sinus below the angle of the jaw contained sulfur granules typical of Actinomyces bovis. Sulfadiazine therapy was started, 4.1 Gm. daily for seventeen days and slightly smaller doses for five more days being given. She rapidly improved. The sinus was healed within two weeks and the swelling gradually receded. She was dismissed on March 4 after receiving a total of 84 Gm. of sulfadiazine.

7. To be reported in detail by Drs. James McNaught and William M. M. Kirby, Stanford Medical School.

After two weeks at home the swelling of the jaw recurred and she was readmitted to the hospital on April 8, 1942. Although roentgenograms showed continued healing of the mandible, sulfur granules were again present in the pus. She had developed a slight leukopenia while on sulfadiazine, so she was given sulfathiazole, starting with 0.7 Gm. every four hours and then 0.3 Gm. every four hours, from April 15 to May 2, 1942. Again she rapidly improved and was dismissed May 2, 1942. She was followed in the outpatient department and had no evidence of infection when last seen on Nov. 5, 1943, a year and a half later. A roentgenogram on Nov. 5, 1943 showed a normal mandible.

This girl has apparently been cured of a cervicofacial type of actinomycosis in which there was extensive involvement of the mandible. She was much improved by three weeks of sulfadiazine therapy, but an additional three weeks of sulfathiazole was necessary to cure her. This course emphasizes the necessity for a longer period of treatment when there is bony involvement.

CASE 14.—Mrs. M. W., aged 27, a housewife, Chinese, entered the San Francisco Hospital on May 21, 1943 complaining of upper abdominal pain of two days' duration. She died ten days later.

One year prior to entry she began to have attacks of right upper abdominal pain and fever, never accompanied by jaundice. She entered another hospital in December 1942, where a liver abscess was drained posteriorly and Actinomyces was cultured from the pus. A right pleural effusion developed, following the operation, but no organisms were cultured from the fluid. Her weight fell from 101 to 75 pounds (46 to 34 Kg.). She was given sulfathiazole 9 Gm. daily for three weeks followed by 4 Gm. for several more weeks. She was then allowed to return to her home, but within ten days she had a recurrence of fever and right upper abdominal pain.

Examination on admission to the San Francisco Hospital revealed that she was slightly jaundiced. Her temperature was 101 F. A smooth, tender liver extended nearly down to the iliac crest, and the spleen to the level of the umbilicus.

Blood cultures were positive for Actinomyces, type undetermined. Tuberculin and coccidioidin tests were negative. Roentgenograms showed an elevation of the right leaf of the diaphragm and enlargement of the liver and spleen.

Sulfathiazole was started, 1 Gm. every four hours for forty-eight hours. The temperature fluctuated between 101 and 104 F. She became progressively more jaundiced and was comatose before death on May 31. At autopsy the essential findings were multiple abscesses in the liver and between the liver and the abdominal wall. There was a 1 cm. abscess in the submucosa of the stomach on the lesser curvature in the prepyloric area. Numerous sulfur granules were found in the abscesses in the liver and stomach. The lungs showed extensive bronchopneumonia. Dr. Alvin J. Cox of the Stanford department of pathology concluded "There is little doubt that the port of entry for Actinomyces in this case was the stomach, and there is no definite evidence of a previous lesion in this organ. Chronic suppurative lesions were extensive in the liver, accounting for most of the clinical features of the case."

This woman developed actinomycosis of the stomach and liver one year prior to her death. On sulfathiazole therapy she improved rapidly and was considered cured. The infection recurred and was rapidly fatal. Perhaps a longer course of sulfonamide therapy might have cured her. The autopsy findings indicated that the port of entry of Actinomyces was through the stomach.

CASE 15.—A woman aged 47, a school teacher, entered Stanford Hospital on Nov. 18, 1940 complaining of a swollen left jaw. On August 15 she had had two lower left molar teeth extracted. The gums healed, and she had no trouble for six weeks. About November 1 she began to have difficulty in opening her mouth, and a hard, nontender swelling appeared on the left side of her jaw.

Examination on admission showed a lemon sized swelling on the left mandible anterior to the angle. On November 19 the mass was aspirated but no pus was obtained. On November 26 she was started on sulfathiazole, being given 1 Gm. every four hours. On December 1 pus was obtained which contained the typical sulfur granules of actinomycosis. On December 6, after eleven days of sulfathiazole, she developed a generalized rash and a fever, and the drug was discontinued. On December 10 sulfanilamide was started, 1 Gm. every four hours. After two weeks the dose was reduced to 0.5 Gm. every four hours and at the end of one month to 0.5 Gm. four times daily. Under the treatement with sulfanilamide the drainage ceased and the indurated mass gradually diminished in size. She was dismissed seven weeks after starting the sulfanilamide with a 2 cm. area of induration anterior to the angle of the jaw. She was kept on a dosage of 0.5 Gm. of sulfanilamide four times daily for six more months. Now, four years after the onset of her infection, there is no evidence of any recurrence.

This is a four year cure of cervicofacial actinomycosis after use of iodide, x-ray therapy and a long course of sulfanilamide.

CASE 16.—D. M., a man aged 29, a pipefitter's helper, entered the San Francisco Hospital on May 22, 1942 for a swelling of the left side of his face. One month previously a swelling developed over the left mandible below the left parotid. The left eyelids became swollen and he had difficulty in opening his jaw. An abscess, localized in front of the left ear, was drained by his private physician. Actinomyces granules were identified, and he was sent to the San Francisco Hospital. Examination on admission showed a swelling on the left side of his face, involving the preauricular region, the left eyelids and the parotid, submaxillary and upper cervical areas. Roentgenograms showed osteomyelitis involving the left descending ramus of the mandible. On May 29 the incision made originally was enlarged and he was started on sulfanilamide, hot compresses and roentgen irradiation. He was given sulfanilamide 1 Gm. every four hours for four days and then put on sulfathiazole 1 Gm. every four hours for four days. On June 7 he was also given potassium iodide in increasing dosage and his jaws were wired. He received no sulfonamides from June 11 to June 30. On the latter date he was again started on sulfanilamide 1 Gm. every four hours. This was decreased to 0.6 Gm. three times daily, and this small dose was continued to July 19, when it was further reduced to 0.3 Gm. three times daily. He continued to improve. Drainage ceased, the induration diminished and roentgenograms showed healing of the osteomyelitis of the jaw. He was discharged to the outpatient department on Aug. 4, 1942. The jaw was kept wired for two more months. He had returned to work in a shipyard by July 10, 1943 and on Oct. 6, 1943 had no evidence of recurrence.

This case of extensive involvement of actinomycosis of the cervicofacial type was cured by surgical drainage, wiring of the jaws and the administration of iodide and sulfanilamide. We believe that a more intensive course of sulfonamide therapy, preferably sulfadiazine, might have produced a more rapid cure. Also we do not feel that it is necessary to wire the jaws during treatment.

CASE 17 (follow-up note on case 2 in our report in 1941 [1]).—E. Z., a man, now 28 years old, was treated for actinomycosis of the chest wall in 1939. At that time the organisms were demonstrated in smears after the termination of a rather brief course (seventeen days) of sulfanilamide, but he went on to apparent clinical recovery. However, the roentgen appearance of the chest never became entirely normal.

Two years later, in September 1941, he again began to have pain in the right chest. This forced him to reenter the hospital in May 1942. He was febrile and had a moderate secondary anemia. The pleura and chest wall over the right

lower lobe of the lung were involved in an inflammatory process. In spite of repeated attempts, no significant organisms were ever recovered from the sputum or by aspiration of the local lesion.

On the assumption that this was a recurrence of the actinomycosis, he was placed on sulfadiazine 6 Gm. daily. This was reduced in four days to 3 Gm. owing to nausea and crystalluria, and the therapy was continued for seven weeks. The dose was then reduced to 1 Gm. daily and finally discontinued entirely after four more weeks. The total course of treatment was therefore nearly three months. The fever remitted after the first week, and he rapidly gained strength. A few months later he felt well enough to apply for service in the Army but was refused. He then obtained work as a timekeeper, which he has been able to do satisfactorily. However, from time to time he still complains of soreness in the right chest. The most recent roentgenogram, made in April 1943, showed some residual opacities in the right chest.

Conclusions in this case must be circumspect, since it was not proved definitely that the recurrent disease was actinomycosis and there is no certainty that there may not be further recurrences.

IN VITRO TESTS OF SUSCEPTIBILITY OF ACTINOMYCES TO SULFADIAZINE AND PENICILLIN

In an attempt to determine the relative chemotherapeutic potency of sulfadiazine and penicillin against actinomycosis, the direct in vitro effect of these agents was studied. Three strains of Actinomyces [8] were grown for five to seven days in thioglycolate medium to which varying concentrations of the therapeutic agent were added, as shown in table 2. The results obtained with penicillin were somewhat more encouraging than those recently reported by Keeney and his co-workers.[9]

It is apparent that the different strains of Actinomyces vary considerably in their susceptibility to sulfadiazine and penicillin (table 2). If 10 mg. per hundred cubic centimeters in the blood is considered an average good therapeutic level for sulfadiazine, and 0.5 unit per cubic centimeter a high therapeutic level for penicillin, it is clear that sulfadiazine is more potent. With three times this content of penicillin, a level which is seldom maintained under present clinical conditions, penicillin may surpass sulfadiazine in efficacy. In no case does the combination of the two drugs significantly exceed the effect of the separate drugs, especially sulfadiazine, and in some trials the combination appeared to be less effective than sulfadiazine alone.

The inhibitory effect of either drug was usually apparent after one day of incubation, and in certain trials penicillin appeared to be slightly more effective during the first two or three days than at the end of the experiment. This may be due partly to destruction of penicillin in the culture tubes.

The general conclusions may be drawn that, unless exceptionally high concentrations of penicillin are used, this drug appears to be slightly inferior to sulfadiazine against various strains of Actinomyces in vitro and that the combination of the two drugs in usual dosage does not improve the results.

TABLE 2.—*Growth of Three Strains of Actinomyces in Vitro in the Presence of Sulfadiazine and Penicillin*

Series	Control	Sulfadiazine, 10 Mg. per 100 Cc.	Penicillin			Sulfadiazine, 10 Mg. per 100 Cc. + Penicillin		
			0.5 Unit per Cc.	1 Unit per Cc.	1.5 Units per Cc.	0.5 Unit per Cc.	1 Unit per Cc.	1.5 Units per Cc.
			1. B2: Actinomyces Hominis (Derivation Unknown)					
0	3+, 3+	2+, 2+	3+, 3+	.....	.....	3+, 3+, 3+	.....	.....
1	3+	2+	1+	.....	.....	1+	.....	.....
2	3+, 3+	1+, 1+, 1+	.....	2+, 2+, 2+	.....	.....	3+, 3+, 3+	.....
3	3+, 3+	2+, 2+, 2+	3+, 3+, 3+	.....	.....	1+, 1+, 1+	.....	.....
4	2+, 3+, 3+	2+, 2+, 2+	.....	3+, 3+, 3+	.....	.....	2+, 1+, 1+	.....
5	3+, 3+, 3+	2+, 2+, 2+	.....	.....	1+, 1+, 1+	.....	.....	2+, 2+, 1+
			2. B3: Actinomyces Isolated from Air, March 2, 1936					
0	3+, 3+	2+, 2+	3+, 3+	.....	.....	3+, 3+	.....	.....
1	2+	1+	.....	3+	.....	.....	2+	.....
2	3+, 3+, 2+	2+, 2+, 2+	.....	3+, 3+, 3+	.....	.....	3+, 3+, 3+	.....
3	3+, 3+, 3+	1+, 1+, 1+	2+, 2+, 2+	.....	.....	1+, 1+	.....	.....
4	3+, 3+, 3+	1+, 1+, 1+	2+, 2+, 2+	.....	.....	.....	1+, 1+, 1+	.....
5	3+, 3+, 3+	1+, 1+, 1+	.....	.....	2+, 2,+ 1+	.....	.....	1+, 1+, 1+
			3. B4: Actinomyces Bovis A. T. C. C., 3007					
0	3+, 3+	2+, 2+	3+, 3+	.....	.....	3+, 3+	.....	.....
1	3+	2+	.....	2+	.....	.....	2+	.....
2	2+, 2+, 2+	1+, 1+, 1+	.....	2+, 2+, 1+	.....	.....	1+, 1+, 1+	.....
3	1+, 1+, 0	1+, 1+, 0	1+, 1+, 1+	.....	0, 1+, 1+	.....	.....	.....
4	1+, 1+, 0	1+, 1+, 1+	.....	1+, 1+, 1+	.....	.....	0, 1+, 1+	.....
5	1+, 1+, 0	1+, 1+, 1+	.....	.....	1+, 1+, 1+	.....	.....	0, 1+, 1+

* 0 means no growth; 1+, light growth; 2+, moderate growth; 3+, heavy growth.

COMMENT

An analysis of the end results summarized in table 1 shows that both the sulfonamides and penicillin are highly effective drugs in the treatment of actinomycosis. Every case showed prompt improvement when the dosage was adequate. All patients, except the 2 who died, have remained either cured or with the process arrested for considerable periods, and the 2 patients who died (12 and 14) had at one time been improved on sulfonamide. Patient 12, with extensive pulmonary involvement, was improved on each short course of sulfadiazine, but it was not continued long enough on any occasion to be effective. Patient 14, with extensive liver and peritoneal abscesses, was improved by sulfathiazole and the process was arrested for several months after the drug was stopped, but the short course given in the terminal stage was ineffective.

Actinomyces bovis was found to be the infective organism in 12 of the 16 cases described; one was identified as Actinomyces asteroides. In 3 cases the exact species was not identified.

Of the 11 cervicofacial cases, there had been dental extractions in 9. In 6 there had been extractions before the infection became evident, and in 3 there had been extractions after the infection started. In the other 2 cases pus was draining from around one or more

8. Obtained from the Department of Bacteriology of the Stanford Medical School.

9. Keeney, E. L.; Ajello, Libero, and Lankford, Elsie: Studies on Common Pathogenic Fungi and on Actinomyces Bovis: III. In Vitro Effect of Penicillin, Bull. Johns Hopkins Hosp. **75**: 410 (Dec.) 1944.

teeth. These cases support the "endogenous" theory of infection, which suggests that the pathogenic organisms are more or less constantly present in the mouth and alimentary canal, rather than the "exogenous" theory, which suggests that the infective organisms are taken into the mouth accidentally and at once penetrate into the tissues. Also the occupations and mode of living of the patients were not such that frequent contact with infected cattle, straws and so on was possible, except for the 9 year old Indian girl.

The in vitro effects of penicillin and sulfadiazine corroborate the clinical impression that different strains of actinomycosis vary considerably in susceptibility to these drugs. These results suggest that, in adequate doses, sulfadiazine may be more effective clinically than penicillin but that both drugs are potent agents against actinomycosis.

CONCLUSIONS

1. Sixteen cases of actinomycosis were treated with sulfonamides or penicillin. These cases include 3 pulmonary, 2 abdominal and 11 of the cervicofacial types.

2. Of the 16 cases treated, 7 may be considered cured and 7 arrested, while 2 ended fatally.

3. In vitro tests corroborate the clinical impression of varying susceptibility of Actinomyces to sulfadiazine and penicillin and of the slightly greater efficacy of sulfadiazine in certain instances.

4. The results in these cases indicate that both penicillin and the sulfonamides are highly effective drugs in the treatment of actinomycosis.

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REACTIONS TO 10,000 POOLED LIQUID HUMAN PLASMA TRANSFUSIONS

CAPTAIN EDWARD B. MILLER
AND
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MEDICAL CORPS, ARMY OF THE UNITED STATES

The use of human blood plasma has become so prevalent that it is now firmly entrenched as an important part of our medical armamentarium. Since little has been reported concerning the reactions which may follow the administration of plasma,[1] it was felt that a detailed analysis of the extensive data collected at the Plasma Station of Fitzsimons General Hospital would add to the knowledge of this subject.

Each bottle of liquid plasma that is shipped from the Plasma Station is accompanied by a questionnaire which requests the pertinent information needed for a study of both beneficial results and reactions. The form is filled out by the attending physician and forwarded to our laboratory. Our report is based on an analysis of 10,000 such questionnaires returned from the 353 military hospitals within the continental United States provided with plasma by this station. The thousands of other plasma transfusions which have been given, using plasma supplied by this laboratory, and for which no questionnaires have been returned, have not been incorporated in this report.

From the Plasma Station, Fitzsimons General Hospital, Denver.

1. Erf, L. A., and Jones, H. W.: Experiences Associated with a Transfusion Unit in 700 Bed Hospital; Survey of Over 3,500 Administrations of Blood and Plasma, Ann. Int. Med. **19:** 1 (July) 1943. Muirhead, E. E., and Hill, J. M.: The Advantages and Clinical Uses of Dessicated Plasma Prepared by the Adtevac Process, ibid. **16:** 286 (Feb.) 1942. Weinstein, J. J.: Reactions from Transfusions of Unpooled Liquid Human Plasma: Analysis of 1,500 Transfusions, M. Ann. District of Columbia **11:** 226 (June) 1942. Lozner, E. L., and Newhouser, L. R.: Preservation of Normal Human Plasma in the Liquid State: I. A Statistical Study of 1,751 Administrations, J. Clin. Investigation **23:** 343 (May) 1944.

THEORETICAL TYPES OF REACTIONS

From a theoretical point of view there are several classes of reactions that may occur following plasma transfusions. These may be enumerated as follows:

1. Thermal or pyrogenic reactions.
2. Allergic reactions.
3. Hemolytic reactions.
4. Toxic reactions due to use of sodium citrate and merthiolate.
5. Transmission of infectious diseases from the donor.
6. Reactions due to bacterial contamination.
7. Pulmonary embolism.
8. Cardiac failure due to overloading of the circulation.
9. Miscellaneous reactions.

It is at once obvious that, in general, these classes of reactions are similar to those which may follow whole blood transfusions. However, because of the essential differences between whole blood and plasma, certain of these theoretical reactions have no practical bearing.

Thermal or Pyrogenic Reactions.—These reactions are characterized by chill and/or fever of a relatively transient nature. Such reactions are usually considered to be caused by either foreign substances or toxic products of bacterial growth called pyrogens.[2] Pyrogens are heat stable up to three hours of autoclaving and also water soluble. Hence their peculiar ability to produce reactions when present in a solution administered parenterally is in no way affected by the sterility of the solution, since they are not bacteria but the result of bacterial growth. Since mildly incompatible whole blood transfusions may result in uncomplicated chill and fever clinically indistinguishable from a pyrogenic reaction, we believe that the term thermal reaction is preferable despite the fact that the usual offending agent is pyrogenic. From the very method of the preparation of plasma it is evident that thermal reactions due to pyrogens can and do follow plasma transfusions.

Allergic Reactions.—The occurrence of allergic reactions following whole blood transfusions have been thoroughly detailed by Kilduffe and DeBakey.[3] According to them, these reactions fall into three types: the mild form characterized by urticaria of a more or less generalized nature, the moderately severe form evidenced by difficulty in breathing and loss of sphincteric control, and the severe type resembling anaphylactic shock. In our own experience only the mild and moderately severe forms of allergic reactions have been noted following plasma transfusions. Nevertheless the possibility of an anaphylactic reaction cannot be excluded, since the same factor responsible for such an occurrence following whole blood transfusion is probably also present in plasma.

The mechanism of allergic reactions following whole blood or plasma transfusions is not at all clear. In some cases the underlying cause is possibly due to the introduction of substances derived from ingested food by the donor to which the patient may be sensitive. In others, passive transfer of sensitivity to the patient may be the explanation. This will be taken up later under the analysis of allergic reactions.

2. Nelson, C. M.: The Cause of Chills Following Intravenous Therapy, J. A. M. A. **112:** 1,303 (April 8) 1939. Rademaker, L.: Cause and Elimination of Reactions After Intravenous Infusions, Ann. Surg. **92:** 195 (Aug.) 1930.

3. Kilduffe, R. A., and DeBakey, M.: The Blood Bank and the Technic and Therapeutics of Transfusions, St. Louis, C. V. Mosby Company, 942, p. 500.

Hemolytic Reactions.—Hemolytic reactions may be the most severe and fatal form of reaction following whole blood transfusion. These are almost invariably caused by agglutination and hemolysis of the donor's cells by the recipient's incompatible plasma. Plasma prepared in the usual manner may contain a trace of red cells or hemoglobin due to hemolysis of the blood or the incomplete separation by centrifugation. In any case, the concentration is of such order as to make a hemolytic reaction most improbable. Hemolytic reactions of a mild type may conceivably occur when agglutinins are administered to a recipient with incompatible cells. This presupposes the presence of a high agglutinin titer in the transfused plasma. Aubert and his associates [4] have shown that by giving high titer O plasma or serum to group A recipients an anti-A titer of 1:512 in vitro was necessary to produce a mild reaction of a questionably hemolytic nature. Furthermore, plasma is usually processed by pooling several or more bloods. In this laboratory the plasma from six to eight bleedings is pooled at random and regardless of type to make a total of 2,000 cc. High titers of agglutinins have not been found in pooled plasma. In testing fifty such pools at random the highest titer encountered was 1:16, using the tube slide method and not centrifuging. These results are in accord with those of others.[5]

There are several factors responsible for the low titers found in pooled plasma. These may be summarized as follows:

1. Suppression of agglutinins. Levinson and Cronheim and others [6] have found that group A serum (or plasma) mixed with group B serum (or plasma) lowered the agglutinating power of both serums. Aubert, Boorman and Dodd [6] showed this to be due to the presence of group specific agglutinogens in plasma.

2. Dilution of agglutinins. In the preparation of plasma a certain amount of dilution occurs. There is the addition of 50 cc. of 4 per cent sodium citrate in the bleeding bottle, 200 cc. of 50 per cent dextrose in the pooling bottle and 5 cc. of 1 per cent merthiolate solution in the final container. This results in about 25 per cent dilution of the plasma and its agglutinins.

3. Adsorption of agglutinins by red cells present in plasma. As mentioned before, centrifugation of the citrated whole blood is seldom complete. The average pool of plasma contains 0.5 to 1 cc. of red cells which have been aspirated into the pooling bottles from bottles containing the centrifuged blood. Our experiments have shown that such concentrations of red cells adsorb agglutinins to the extent of lowering the titer of, for example, 1:32 to 1:16 or 1:8.

In addition to the fact that pooled plasma is low in agglutinin titer, there is further dilution within the recipient's circulation and possible neutralization by the presence of agglutinogens in the plasma of the patient.

In view of the foregoing facts, the probability of a hemolytic reaction following the use of pooled human plasma may certainly be minimized. Indeed, there is no well authenticated report of a hemolytic reaction ever having occurred following a pooled plasma transfusion.

One more possible factor in the production of a hemolytic reaction following a plasma transfusion remains to be discussed. This concerns the role played by the Rh factor and its agglutinins as reported by Wiener and Peters.[7] The Rh factor is present only in red cells; hence plasma cannot stimulate the production of Rh agglutinins in an Rh negative recipient with subsequent reactions to later whole blood transfusions. Since the agglutinins are present in plasma, it is conceivable that they could produce a hemolytic reaction in an Rh positive recipient. From practical considerations this is highly improbable. Anti-Rh agglutinins are found only in Rh negative pregnant or postpartum women and in Rh negative individuals who have been recently transfused with Rh positive blood on several occasions. It is fair to assume that such individuals would not be permitted to donate blood.

Toxic Reactions.—Ever since the advent of the use of sodium citrate as an anticoagulant to facilitate blood transfusion, a controversy has raged over its possible toxicity. Suffice it to say that the majority of workers in this field agree that reactions formerly thought to be due to sodium citrate were in reality pyrogenic in nature. As much as 8 Gm. has been administered intravenously without toxic effect.[8] Actual analyses of samples of plasma prepared in this laboratory revealed the sodium citrate concentration to be about 300 mg. per hundred cubic centimeters.

One cc. of 1 per cent merthiolate solution is added to each hundred cubic centimeters of plasma as a preservative, giving a final dilution of 1:10,000. Some objection may be raised to the use of a mercury compound especially in shock and burn cases in which kidney function may have already been depressed. However, toxicity tests have demonstrated the innocuity of merthiolate; 180 cc. of 1 per cent merthiolate solution has been injected intravenously over a twenty-four hour period without untoward effect.[9] This is the equivalent of the merthiolate present in 36 pints of plasma. Nevertheless it must be remembered that an occasional patient may exhibit an idiosyncrasy to mercury or thio compounds. In this series no such reactions were reported.

Transmission of Infectious Diseases from the Donor.—The transmission of various bacterial diseases can be and has been effected by blood transfusions. This does not apply to plasma transfusions. Even assuming that a donor with a bacteremic disease should donate blood, the aerobic and anaerobic cultures, which are made at least twice during the processing of plasma, would detect the contamination.

There are many reports concerning the transmission of malaria and syphilis in the course of a blood transfusion. It was formerly considered possible for malaria to be transmitted through the medium of plasma.

4. Aubert, E. F.; Boorman, K. E.; Dodd, B. E., and Loutit, J. F.: Universal Donor with High Titer Isoagglutinins; Effect of Anti-A Isoagglutinins on Recipients of Group A, Brit. M. J. **1**: 659 (May 30) 1942.

5. Thalhimer, W.: Intravenous Injection of Pooled Normal Plasma or Serum: Is It Dangerous? J. A. M. A. **120**: 1263 (Dec. 19) 1942. Lozner, E. L., and Newhouser, L. R.: Preservation of Normal Human Plasma in the Liquid State: IV. Studies on Isohemagglutinin Titers, J. Clin. Investigation **23**: 361 (May) 1944.

6. Levinson, S. O., and Cronheim, A.: Suppression of Isoagglutinins and Significance of This Phenomenon in Serum Transfusions, J. A. M. A. **114**: 2097 (May 25) 1940. Aubert, E. F.; Boorman, K. E., and Dodd, B. E.: Agglutinins Inhibiting Substance in Human Serum, J. Path. & Bact. **54**: 89 (Jan.) 1942.

7. Wiener, A. S., and Peters, H. R.: Hemolytic Reactions Following Transfusions of Blood of the Homologous Group, with 3 Cases in Which the Same Agglutinogen Was Responsible, Ann. Int. Med. **13**: 2306 (June) 1940.

8. Neuhof, F. H., and Hirshfeld, S.: Slow Intravenous Administration of Large Doses of Sodium Citrate: New Method for Control of Bleeding, New York M. J. **113**: 95 (Jan. 15) 1921.

9. Powell, H. M., and Jamieson, W. A.: Merthiolate as Germicide, Am. J. Hyg. **13**: 296 (Jan.) 1931.

Lozner and Newhouser,[10] in a study of thirty-five transfusions of plasma obtained from donors suffering from active malaria whose blood smears demonstrated the malarial parasite, showed that, following the processing of plasma into either liquid or dried form, there was no likelihood of transmission. As an added precaution, prospective donors with a history of malaria within the past fifteen years are rejected.

The Kahn test is performed on a sample of every donor's blood. Those in which positive reactions occur are discarded. Positive Kahn reactions in our series of 140,000 donors amount to about 0.4 per cent. Kolmer and Rule,[11] studying the survival of Treponema pallidum in blood plasma, found that there was spontaneous sterilization within twenty-four hours after they had seeded citrated blood. There are no reports of a case in which syphilis has been transmitted through a plasma transfusion.

The possibility of jaundice occurring one to four months following the administration of plasma has been known for some time.[12] The difficulty of maintaining an adequate long term follow-up of military personnel who have received plasma is apparent. No instance of any such occurrence has been reported to the Plasma Station. Little is known of the mechanism of transmission of this condition. The donors themselves whose blood or plasma causes this type of jaundice are not known to have suffered from jaundice. Because no other means are available to exclude this transmissible disease, donors with a history of jaundice in the previous six months are rejected.

Reactions Due to Bacterial Contamination.—The collection of blood and its processing into liquid plasma at this laboratory is performed entirely in a closed vacuum system by the technic described by Newhouser and Kendrick.[13] Twice during the procedure, cultures are taken in Brewer's medium, which will readily reveal ordinary aerobic and anaerobic micro-organisms. These cultures are kept for ten days each, and all must be negative before the final product is released. The contamination rate for more than 70,000 pints of plasma is about 1 per cent. Bacterial contamination in the finished product is therefore not a likely factor in the reaction rate. Occasionally, bottles of plasma have been returned because of suspected contamination. In every case, tests have shown such plasma to be sterile. Excessive fibrin had been confused with bacterial growth.

Pulmonary Embolism.—There are varying amounts of precipitated fibrin in many bottles of plasma, particularly in the older ones. These amounts may be such that pulmonary embolism could result from an intravenous plasma transfusion. Such a case has been reported.[14] This unfortunate result can occur only when plasma is administered without proper filtration. Therefore the plasma transfusion set must have incorporated in it a suitable filter. No instance of embolism following a transfusion of properly filtered plasma is known. The label on each bottle of plasma shipped from this laboratory contains this warning: Caution: A Filter Must Be Used.

Cardiac Failure.—Cardiac failure as the result of an overburdening of the circulation subsequent to a plasma transfusion, particularly in patients with poor cardiac reserve, is a possible complication. This is, of course, not peculiar to plasma transfusions and may follow the intravenous injection of any solution given in quantity. The condition of the patient, the indication for the use of plasma, the speed of administration and the amount transfused are all features more concerned with this problem than the administration of plasma per se.

Miscellaneous Reactions.—Finally there is a miscellaneous group of reactions which cannot be definitely classified or in which the symptom syndrome is not clearcut. Nausea, vomiting, transient pains in the back or elsewhere, cardiac palpitation, anxiety states and profuse sweating, as well as idiosyncrasies of the patients, are examples of this group. From their character, it is possible that many are on a psychic basis. All of them are transient and not one has been reported as of a serious nature. Many of the aforementioned signs and symptoms accompany the thermal and allergic reactions.

TABLE 1.—*Types of Reactions*

Number of questionnaires received	10,000	
Number of reactions reported *	296	2.96%
Number of patients experiencing reactions	258	
Thermal reactions	209	65.1%
Allergic reactions	105	34.2%
Miscellaneous reactions	2	0.7%

* Eleven patients experienced combined reactions of the thermal and allergic types from the same plasma transfusion.

TABLE 2.—*Thermal Reactions*

Onset extremes	Immediate to 12 hours
Average for 164 cases	61 minutes
Duration extremes	3 minutes to 12 hours
Average for 45 cases	112 minutes
Types	
Chill and fever	186
Chill alone	8
Fever alone	6
Severity	
Mild	104
Moderate	63
Severe	19
Fever range	99.4 F. to 111 F.
Average for 52 cases	103.2 F.

ANALYSIS OF DATA

From the foregoing discussion it will be seen that only two types of reactions following plasma transfusions are worthy of practical consideration, namely the thermal and the allergic. The small miscellaneous group is unimportant. In this analysis of reactions following 10,000 plasma infusions, it was possible to group them all in these three classifications.

Thermal Reactions.—The usual thermal reactions consisted of chill and temperature rise of from 102 to 103.5 F., beginning about thirty minutes after the onset of the infusion and lasting fifteen to thirty minutes. Reactions of this nature were considered as mild reactions. Thermal reactions that exhibited higher temperatures or lasted a few hours or longer were called severe. In addition to the chill and fever, other signs or symptoms were present in some cases. These were apprehension, pallor, substernal oppression, flushing and, very rarely, muscular pain and cyanosis. In table 2 are presented the extremes and averages of some

10. Lozner, E. L., and Newhouser, L. R.: Studies on Transmissibility of Malaria by Plasma Transfusions, Am. J. M. Sc. **206**: 141 (Aug.) 1943.

11. Kolmer, J. A., and Rule, Anna M.: Note on Survival of Treponema Pallidum in Preserved Citrated Human Blood and Plasma, Am. J. Syph., Gonor. & Ven. Dis. **26**: 156 (March) 1942.

12. Beeson, P. B.: Jaundice Occurring One to Four Months After Transfusion of Blood or Plasma: Report of 7 Cases, J. A. M. A. **121**: 1332 (April 24) 1943.

13. Newhouser, L. R., and Kendrick, D. B.: Human Plasma Manual, United States Naval Medical School, Washington, D. C., 1941.

14. Mayner, F.: Death from Transfusion of Plasma, J. A. M. A. **115**: 2015 (May 3) 1941.

of the signs and symptoms described occurring in this type of reaction.

As previously stated, we believe that the vast majority of these reactions are due to the presence of pyrogens introduced during either the procurement of the blood, the processing of plasma or the actual transfusion itself. The technic of procuring blood and of processing it into plasma is performed in a closed vacuum system in which the 4 per cent sodium citrate used as an anticoagulant and the 50 per cent dextrose in the pooling bottle have been found to be pyrogen free. The distilled water used in making the 1 per cent merthiolate solution is fresh and pyrogen free, as determined by the permanganate test. Obviously, then, if the solutions added to plasma are free of pyrogenic contamination, subsequent pyrogens must be introduced by means of the apparatus (tubing, needles and valves) used in the preparation and administration of plasma. Scrupulous care of all such apparatus is of the utmost importance. While other workers have emphasized this, we feel that the subject will bear repetition.

A definite routine has been established for the care of this apparatus. All needles, tubing and valves are cleaned immediately after use. No more than a few minutes are allowed to elapse between the time of use and the washing of these parts. This is essential to prevent clotting and adherence of blood or plasma to the

TABLE 3.—*Analysis of Thermal Reactions by Pools of Plasma*

Number of Reactions in Same Pool	Number of Pools Involved	Number of Negative Reports of Bottles in Same Pool	Number of Reports Not Received in Same Pool	Total Number of Reactions
2	14	2	0	28
2	4	0	2	8
1	69	3	0	69
1	47	2	1	47
1	43	1	2	43
1	5	0	3	5
Total	182	..	..	200

apparatus. The parts are completely disassembled and washed twice with freshly distilled pyrogen free water under pressure. A third washing is performed with sterile pyrogen free saline solution freshly prepared. The needles are carefully styletted and the tubing is minutely scrutinized for any adherent blood or plasma. The valve parts are glycerinated and reassembled. The entire set is put together and wrapped. The sets are then autoclaved, always within three hours from the time the apparatus was washed. This minimizes bacterial growth and therefore diminishes the occurrence of pyrogens. This method, while seemingly simple, has proved to be eminently satisfactory.

The foregoing procedure is strongly recommended for the proper care of the apparatus in the actual administration of plasma. Since the Plasma Station supplies plasma to more than 350 hospitals, it is difficult to exert control over this factor. Unquestionably many pyrogenic reactions occur because of this. To illustrate: Hospital A had 1 thermal reaction in 750 plasma transfusions, hospital B had 4 in 600, while hospital C had 6 in 150. It seems logical to assume, since all three hospitals are supplied with plasma made under standard conditions, that the difference in thermal reaction rate (hospital C having a rate thirty times greater than hospital A) could be attributed to local causes.

In order to emphasize further the point that thermal reactions may be the result of factors not present in the actual processing of plasma, an analysis of this type of reaction by the pools involved was made as presented in table 3. Each 2,000 cc. pool is dispensed in four 500 cc. bottles.

It will be noted that there were 2 reactions in each of 18 pools. These 36 reactions may be ascribed to the plasma per se, even though in 14 of the pools two other bottles from the same pool gave no reaction. On the other hand, there was only 1 reaction in 116 pools of which either two or three bottles were administered without reaction. It would seem probable that these 116 reactions were not the result of pyrogens present at the time of processing the plasma but more likely were introduced during the administration by improperly cleaned intravenous sets. In addition there were single reactions in each of 48 pools in which one or no other reports were received. No decision can be made concerning this last group owing to lack of data. Assuming the foregoing interpretation to be correct, the thermal reaction rate ascribable to plasma itself would be 0.84 per cent, which would include the group of 48 reactions with either one or no other reports. Another explanation for the discrepancy in reactions to plasma derived from the same pools is that the sensitivity of different individuals to pyrogens may be quite variable. No information is available on this point, although the data may indicate such a possibility.

TABLE 4.—*Allergic Reactions*

Onset extremes *	Immediate to 7½ hours
Average for 79 cases	56 minutes
Types	
Urticarial	102
Asthmatic	3
Anaphylactic	0
Urticarial reactions	
Distribution	
Localized	43
Generalized	59
Severity	
Mild	63
Moderate	17
Severe	2

* One case had an onset of five days and is not included in these figures.

Allergic Reactions.—There were 105 reactions of the allergic type, of which all but 3 were urticarial in nature. The usual urticarial reaction appeared during or soon after the infusion. The skin rash was either generalized or localized. When the latter type was present, the face was usually involved. Accompanying signs and symptoms, aside from itching of the skin, were rarely encountered. The other 3 cases of this group were ones of asthmatic breathing. These allergic reactions responded well to small doses of epinephrine.

TABLE 5.—*Analysis of Allergic Reactions by Pools of Plasma*

Number of Reactions in Same Pool	Number of Pools Involved	Number of Negative Reports of Bottles in Same Pool	Number of Reports Not Received in Same Pool	Total Number of Reactions
3	2	1	1	6
2	6	2	0	12
2	1	0	2	2
1	34	3	0	34
1	22	2	1	22
1	18	1	2	18
1	11	0	3	11
Total	94	..	..	105

There are three possible mechanisms underlying allergic reactions: the transfer of substances derived from ingested food by the donor to which the recipient

is sensitive; passive transfer of sensitivity from donor to recipient; the sensitivity to common normal substances in plasma.

In an attempt to avoid the presence of possibly offending food derivatives in plasma, donors are placed on a semifasting diet consisting mainly of fluids and carbohydrates for the six hour period preceding the blood donation. The transfer of sensitivity is more difficult to control. Prospective donors with active allergic states are rejected. In a series of this type it is not possible to ascertain whether this selection of donors had any effect on the allergic reaction rate.

The data presented in table 5 consist of an analysis of allergic reactions from the same pools. As every allergic reaction must be ascribed to the plasma itself, it is of interest to note the sensitivity of the patients involved in these reactions to various pools. Nine pools were responsible for 20 reactions. Yet 12 pints of plasma from these same pools were given without any untoward result.

In table 6 the data of multiple allergic reactions in the same individuals are presented. The 105 allergic reactions were experienced by 81 different patients. Six of these patients suffered 24 reactions. One patient had as many as 7 allergic reactions to plasma from 5 different pools. Unfortunately it has been impossible to determine the allergic background of these patients.

TABLE 6.—*Multiple Allergic Reactions of Patients to Plasma from Two or More Pools*

Number of Recipients	Number of Allergic Reactions	Number of Pools Involved
1	7	5
1	5	3
1	4	3
1	3	3
1	3	2
1	2	2
Total 6	24	18

It is on the basis of the foregoing data that we believe that many of the allergic reactions are due to the presence of a normal substance common to the plasma of many donors. An individual sensitivity to such substances by certain recipients can be postulated. Otherwise it is difficult to explain the case of 1 individual reacting to 7 bottles of plasma derived from 5 different pools. A probable factor in a certain small percentage is an idiosyncrasy to the citrate, glucose or merthiolate solution present in the plasma.

SUMMARY

In this series of 10,000 pooled liquid plasma transfusions, 296 reactions were reported, a reaction rate of 2.96 per cent. Of these, 200 were thermal reactions and 105 were allergic reactions. Eleven patients experienced combined reactions. There were 2 reactions of a miscellaneous nature. Eighty-nine (a total rate of 0.89 per cent) of the thermal reactions were believed to be ascribable to the plasma itself. Few of the reactions were severe in nature, and no fatalities or near fatalities attributable to the plasma transfusions were noted. There were no hemolytic reactions reported.

It is felt that thermal reactions, in the main, can be prevented. At one hospital where the transfusion apparatus was properly cleaned, one thermal reaction occurred in 750 plasma administrations.

While allergic reactions may be reduced in incidence by careful selection of donors, it is probable that they cannot be entirely eliminated, as there is considerable evidence to show that many of the reactions are due to a substance normally present in plasma to which certain individuals are sensitive. Certain chemical idiosyncrasies are also a factor.

We believe the closed vacuum technic used in obtaining whole blood and in the processing of plasma is the safest method in use from the standpoint of sterility. A contamination rate of approximately 1 per cent in the preparation of more than 70,000 pints of plasma supports this view.

Certain precautions must be observed in the use of plasma. The condition of the patient, indication for use, amount to be given and speed of administration are matters for the judgment of the attending physician. An adequate filter must always be used to prevent precipitated fibrin from entering the circulation and causing embolic phenomena. In the presence of a severe reaction of any type, the plasma transfusion should be discontinued. Subsequent plasma administrations to the same patient should be given from another pool. This is particularly important in the cases of allergic reactions.

CONCLUSIONS

1. Reactions following the administration of pooled liquid human plasma are chiefly of the thermal and allergic types.

2. Hemolytic reactions do not occur as the result of such plasma transfusions.

3. Reactions of the thermal type are largely preventable. Scrupulous and detailed attention to the proper cleansing of all apparatus used is essential in the prevention of pyrogen contamination.

4. Allergic reactions, because of the protein nature of allergies, cannot be prevented in the main.

5. The closed vacuum technic of procuring blood and of processing plasma is the ideal method.

6. The use of pooled liquid human plasma is eminently safe and attended with fairly infrequent reactions of relatively mild nature.

2 East Thirty-Seventh Street.

The First Mercury Thermometer.—The appealingly modest personal story of how he (Daniel Fahrenheit, 1686-1736) came in 1714 to invent the mercury thermometer and the scale of temperature by which his name is daily remembered in English speaking countries is told by a German instrument maker, Daniel Fahrenheit, native of Danzig and long resident in Holland. His was one of the early eighteenth century contributions to the study of the fascinating but complicated physical problem of heat, which will lead us through the work of Joseph Black, Lavoisier, Rumford, Joule, Helmholtz, Kelvin and Gibbs. Besides Fahrenheit, others who developed scales of temperature were R. A. F. de Reaumur, French naturalist (1683-1757) whose "Reaumur scale" (1730) is still used in many countries; Anders Celsius (1701-1744), Swedish astronomer at Uppsala, who first calibrated the centigrade thermometer (1742), divided into 100 degrees between the freezing and boiling points of water and universally employed in scientific work; and William Thomson, Lord Kelvin, who premised an "absolute scale" of temperature on which water boils at 373.7 degrees, freezes at 273.7 degrees and would—theoretically—cease to exist as water if it could ever be got down to absolute zero.—The Autobiography of Science, edited by Forest Ray Moulton and Justus J. Schifferes, New York, Doubleday, Doran & Co., Inc., 1945.

Clinical Notes, Suggestions and New Instruments

MENINGITIS DUE TO SALMONELLA PANAMA

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Two cases of meningitis due to Salmonella panama comprise the material on which this paper is based. Invasion of the human meninges by this organism is not common. These cases are of especial interest, as the source of infection was traced to an attendant in the milk laboratory of the hospital in which the babies were born, and because 1 survived with sulfadiazine therapy.

LITERATURE

Salmonella panama is a subgroup of the typhoid-paratyphoid group of bacteria (Topley and Wilson[1]) and is named for D. E. Salmon, the discoverer. E. O. Jordan identified this particular strain (Salmonella panama) in 1934 as the cause of food poisoning among American soldiers in Panama. In 1938 Schiff[2] described S. panama as a cause of infectious diarrhea among infants in New York City. A more complete account of infantile diarrhea by Abramson, Frant and Oldenbush[3] lists the Salmonella organisms as a prominent cause of this malady. Harvey[4] in 1937 reviewed the literature of Salmonella suipestifer infections and added 21 new cases of his own which had occurred in and around Baltimore.

Hormaeche and his associates[5] believe that Salmonella diarrhea occurs all over the world. Infections due to this group of organisms are more frequent in children, though they do not always localize in the intestinal tract. The state of the Salmonella problem has recently (1943) been reviewed most comprehensively by Bornstein.[6] He proposes the terms Salmonella gastroenteritis (food poisoning), Salmonella fever (typhoidal type) and Salmonella septicemia for the three varieties of cases in human beings.

The genus Salmonella comprises a group of more than one hundred strains of organisms which are pathogenic for animals and man. The sources of infection are protean and include human carriers as well as a wide variety of animals. Spread of infection occurs through handling poultry, eggs, meat, milk and other foods contaminated from animal sources, as well as certain rodents, flies and other insect vectors. It is believed that most cases of Salmonella meningitis follow the septicemic form of the disease, salmonellosis, and the literature contains reports of cases of meningitis due to many different strains of this bacterium.

Neter[7] quotes a review of the literature by Guerra, Peluffo and Aleppo published in 1940 in which he found that they had collected 56 case reports of purulent meningitis due to salmonellosis up to that time and adds 22 other cases collected since then, making a total of 78 cases. He presents another of his own, a hydrocephalic child who died of meningitis due to Salmonella cholerae suis. Bray and Meredith[8] also reported a case in a hydrocephalic child of 4½ months who died of Salmonella sandiego meningitis.

It is the impression of most investigators that Salmonella infection is apt to prove fatal to the very young, to debilitated patients or to those having a mixed infection. Yet Ravitch and Washington's[9] patient, a 4½ year old Negro girl, developed Salmonella suipestifer (also called cholerae suis) septicemia and meningitis complicating meningococcic septicemia and meningitis. She survived, and her survival was attributed by the authors to the preceding meningeal reaction produced by the meningococcus and its antiserum. A 7 year old girl observed by Neter[10] was cured of meningococcic meningitis and Salmonella cholerae suis bacteremia by sulfathiazole. Another patient studied by Neter[11] suffered from S. cholerae suis bacteremia complicating scarlet fever. This patient recovered on sulfanilamide and sulfadiazine medication.

Katsampes and Bradford[12] reported the recovery of a month old infant suffering from Salmonella panama meningitis with sulfapyridine. Wilsdon and Gibson[13] also recorded the case of a man aged 61 who had meningitis due to Salmonella london. His cerebrospinal fluid was sterilized by sulfapyridine, though he subsequently died of hypostatic pneumonia. Patterson's[14] 2 patients with paratyphoid B (Salmonella paratyphi B) meningitis recovered after sulfapyridine and sulfathiazole medication. He concluded that neither drug appeared to be specific but that sulfathiazole was probably to be preferred until some better drug was discovered. Hollis and Barron[15] had a fatality in a child with meningitis of the Salmonella oranienburg type. They stated that sulfonamide medication is effective in certain types of Salmonella meningitis. Of 9 patients who recovered from this condition, out of a group of 53, sulfonamides were used in 5. In the other 44 sulfonamides were used in only 2.

In trying the effect of sulfaguanidine on the various strains of dysentery and Salmonella organisms, Bornstein and Strauss[16] concluded that this drug was effective against bacillary dysentery and against S. paratyphi A and S. cholerae suis, though ineffective against other organisms of the Salmonella group. Sulfathiazole and sulfadiazine have been reported to be effective against other cases of septicemia[17] and a urinary tract infection[18] due to Salmonella organisms. When confronted with a case of purulent meningitis one is still justified in beginning therapy with one of the sulfonamides, preferably sulfadiazine or sulfathiazole. Penicillin has little if any effect on the salmonella group.

REPORT OF CASES

CASE 1.—T., a white male infant, was brought to the hospital on the twenty-third day of life. After a normal full term pregnancy he was delivered with the aid of midforceps on Jan. 24, 1944. He seemed to be vigorous and healthy, weighing 8 pounds 7½ ounces (3,840 Gm.). His course during the ensuing thirteen days was not remarkable. As his mother had a breast infection, he was given the usual formula of evaporated milk, boiled water and dextrimaltose. He nursed well and gained weight normally and was allowed to go home with his mother on February 6.

During the succeeding ten days all went well, but on February 16 he exhibited unusual twitchings and slight generalized convulsive movements, and it was thought that he had an elevation of temperature; consequently he was brought to

From the Percy Jones General Hospital, Battle Creek, Mich.

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see us. The family history and past history were irrelevant. The examination was negative save for a generalized convulsion and temperature of 102 F. He was put in a local hospital and observed for the rest of that day. The next day his temperature was 104 F., and as convulsions had continued at intervals a lumbar puncture was performed even though the fontanel was soft and level and the neurologic examination otherwise negative. Purulent spinal fluid was released under

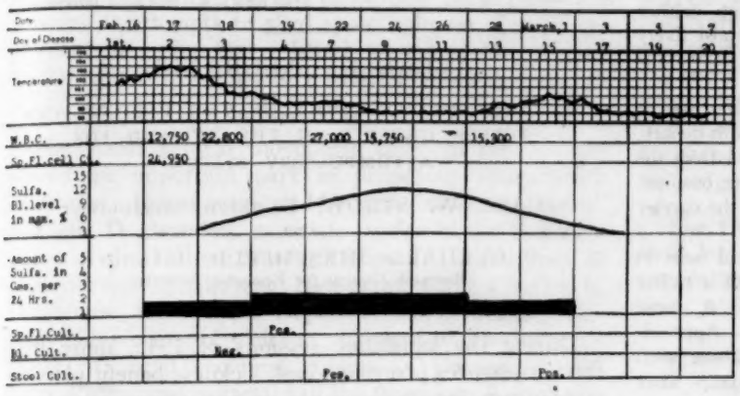

Chart 1.—Course in case 1.

normal pressure. There were 24,950 white blood cells present (95 per cent polymorphonuclears).

Sulfadiazine therapy was instituted immediately. The drug was given by mouth, as the patient was not vomiting. The daily dose varied between 1 and 1.5 Gm. to maintain a blood level of 6 to 10 mg. per hundred cubic centimeters. His clinical response was good. The elevation of temperature subsided gradually during the succeeding several days, and white blood cells, which varied between 22,000 and 27,000 early in the disease, subsided to 15,000 (chart 1).

By February 19 a gram negative motile rod had grown from the spinal fluid culture, later identified as Salmonella panama. The same organism grew from the stool culture but not from the blood. Sulfadiazine was continued till March 1. On that day the patient had begun to vomit, slight puffiness of the eyelids appeared, and the temperature rose to 101 F. Fearing renal damage, the drug was stopped immediately. Subsequent urine examinations were normal, the edema and vomiting quickly disappeared and the temperature subsided. Attempts to obtain cerebrospinal fluid for follow-up examinations were unsuccessful from the lumbar route. As the clinical condition of the patient was so good, it seemed wise not to attempt cisternal or ventricular taps at this time.

He left the hospital March 7 and since that time has continued to do well at home.[19]

CASE 2.—H., a white female infant, was first seen on the twenty-first day of life. She was born in the same hospital, spontaneously at term, Jan. 28, 1944. Her birth weight was 8 pounds 8½ ounces (3,860 Gm.) and she seemed to be normal in every way. She was put to the breast but required additional feedings consisting of evaporated milk, boiled water and dextrimaltose. As the maternity ward was crowded, and as she and her mother were so well, they went home in an ambulance on the fifth day of the puerperium.

On February 14 she did not seem as well as usual. She cried much of the time and refused to eat. A doctor said she had a cold and treated her symptomatically. On February 16 she twitched occasionally. Gradually the hyperirritability increased and she was brought to us on February 18, four days after the onset of the present illness.

The family history and past history were irrelevant. The history as given was elicited. On examination it was apparent that her temperature was moderately elevated and that she was hyperirritable, as evidenced by clonic convulsive movements. The fontanel was full, though not bulging. A lumbar puncture was attempted but no fluid could be obtained. The next day one of us (F. H. M.) obtained a few drops of purulent cerebrospinal fluid from the cistern. From this, the same organism was ultimately isolated (Salmonella panama). As in the first patient, S. panama was also recovered from stool, but not from blood cultures.

This child also was placed on sulfadiazine medication, an average daily intake of 1.5 Gm. producing an average blood level of 8 mg. per hundred cubic centimeters. During the first week her temperature subsided from 103 to 100 F., though the white blood cells remained up around 18,000 to 20,000 per cubic millimeter till March 1. During this period she required small doses of phenobarbital to control her convulsive tendency.

On March 3 a ventricular tap showed the cerebrospinal fluid to be slightly cloudy. It contained 1,120 white blood cells (42 per cent polymorphonuclears and 58 per cent lymphocytes), 18 mg. of sugar per hundred cubic centimeters, 1,013 mg. of protein per hundred cubic centimeters and 11.6 mg. of sulfadiazine per hundred cubic centimeters. By March 20 her temperature averaged 99 F. and the white blood cells 8,500 per cubic millimeter. Though she did not seem toxic (in fact, her weight gain had been satisfactory throughout) the fontanel was bulging, and 45 cc. of clear cerebrospinal fluid was withdrawn from the ventricles. This fluid contained 150 white blood cells per cubic millimeter, 9 mg. of sugar, 1,025 mg. of protein and 4 mg. of sulfadiazine per hundred cubic centimeters. The culture remained sterile (chart 2).

Feeling that she was over the infectious or septic phase of her disease, though fearing hydrocephaly, we discontinued medication and allowed the patient to go home. She was brought in every three or four days. On these visits the head always was tense, and 50 to 100 cc. of clear sterile ventricular fluid containing about 100 lymphocytes was withdrawn. The circumference of her head gradually increased to 17⅛ inches.

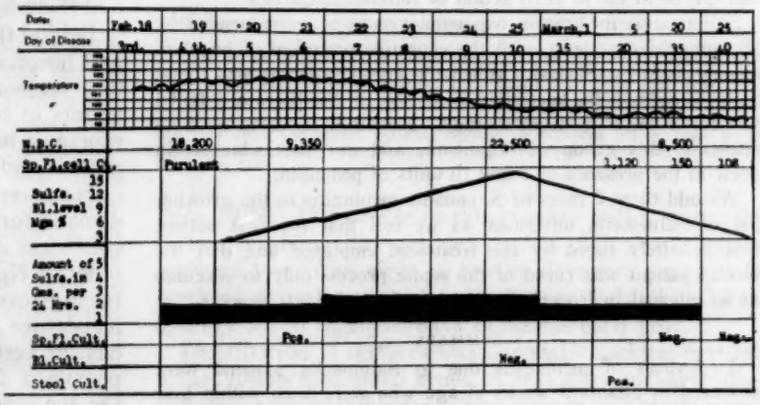

Chart 2.—Course in case 2.

Owing to lack of proper surgical facilities she was referred to Dr. A. Earl Walker of the University of Chicago on April 18 for some possible palliative surgical procedure. Intervention was deemed unwise, and shortly thereafter the baby died.

Postmortem examination revealed "chronic hyperplastic arachnoiditis and ependymitis with severe internal hydrocephalus due to occlusion of the foramen of Munro on the right and stenosis of the foramen of Munro on the left, with bilateral occlusion of the foramens of Luschka and Magendie. The picture is compatible with the end result of Salmonella meningitis."

19. Since this article was written we have heard indirectly that the patient remained well until July 26, on which date he is said to have received a third injection of pertussis vaccine. A stormy illness followed and he died two days later, four months and three weeks after leaving the hospital. The attending physician failed to obtain cultures of blood or of cerebrospinal fluid, but such a clinical course would not suggest that salmonellosis played a part in this last illness.

COMMENT

The 2 cases here reported are of unusual interest as the 2 infants were born at the same hospital within four days of each other. Both were healthy full term babies, cared for in the same nursery and given the same formula. They remained well till the twenty-third and seventeenth days of life, respectively, suggesting a two to three week incubation period.

The same infecting organism, Salmonella panama, was recovered from the spinal fluid and stool cultures of the 2 patients. Though blood cultures remained sterile, and though neither child suffered gastroenteritis, the port of entry was most likely the enteron, with subsequent infection of the meninges via the blood.

So many points of similarity suggested a common source of infection for these 2 patients. The state public health department of Michigan later isolated the identical organism from the stools of an attendant in the milk laboratory of the hospital. It seems reasonable to presume that this person was the carrier from whom these infants received their infection.

Routine stool cultures done on all babies who had been in the nursery around this time revealed the presence of a rather widespread epidemic due to Salmonella panama. A large number had mild infectious diarrhea of short duration. Approximately an equal number showed no symptoms. Three such carriers had positive stool cultures for several months after the initial infection.

When roughly tested on ordinary culture mediums, both cultures were found to be resistant to concentrations as high as 20 mg. of sulfathiazole and of sulfadiazine per hundred cubic centimeters. In view of the favorable clinical result obtained, one of us (A. W. F.) again studied the cultures by a quantitative method, as follows: Approximately 500 organisms per cubic centimeter were inoculated into a medium composed of 10 per cent rabbit serum and Tyrode's solution (p_H 7.4) containing 5 mg. of sulfadiazine per hundred cubic centimeters. Appropriate samples were plated out at various intervals and the number of colonies compared with the control tubes to which no drug had been added. Both strains of S. panama were relatively little affected during the early logarithmic growth phase, but by the end of sixteen hours a 50 per cent reduction in the population of one culture (case 1) and an 80 per cent decrease in the second (case 2) was observed in the presence of 5 mg. of sulfadiazine per hundred cubic centimeters. These data suggested that under favorable conditions the organisms were also susceptible to the in vitro action of sulfonamide drugs.

Sulfonamide medication was employed as is recommended by all authorities, at least until the causative organism of purulent meningitis is established. When the etiologic factor was found to be a Salmonella bacterium a review of the literature failed to offer a better mode of therapy. Penicillin seems to have no effect on this group of organisms, and our particular strain grew in the presence of 5 and 10 units of penicillin.

We add these 2 cases of S. panama meningitis to the growing list of Salmonella infections, as we feel that the first patient was definitely cured by the treatment employed and that the second patient was cured of the septic process only to succumb to an internal hydrocephalus, an aseptic pathologic process.

SUMMARY

Two cases of meningitis due to Salmonella panama were observed in infants 3 weeks of age who were born within four days of each other at the same hospital. The source of infection is believed to have been a carrier of this organism who worked in the hospital milk laboratory. The period of exposure ranged from five to thirteen days. The onset of symptoms occurred in seventeen to twenty-three days.

Sulfadiazine was used for periods ranging from fifteen to thirty-four days. One patient survived with this treatment, but the second died of an internal hydrocephalus due to an inflammatory obstruction, though the cerebrospinal fluid remained sterile.

We recommend routine stool cultures on all hospital attendants who come in contact with infants and debilitated patients.

Special Article

This article has been read by the majority of the members of the Council on Medical Service and Public Relations and is published with the approval of the Council for the information that it contains relating to the factors underlying the demand for federal sickness insurance.

E. J. McCormick, M.D., *Chairman.*

HEALTH INSURANCE

AN INQUIRY INTO SOME OF THE FACTORS AND FORCES UNDERLYING THE DEMAND FOR A COMPULSORY SYSTEM

CARL W. STROW, Research Consultant
AND
GERHARD HIRSCHFELD, Director
Research Council for Economic Security
CHICAGO

During the legislative sessions of 1945, more than thirty measures proposing cash sickness benefit plans or compulsory health insurance systems were introduced in twelve state legislatures. Other bills called for studies of health insurance. In Congress a number of bills were introduced providing for some sort of medical care or sickness benefits. No other year has seen such a demand for compulsory health insurance.

Compulsory health insurance, briefly, is a system by which medical and hospital care would be available to all who desire it, the cost being paid by employers, employees and, possibly, government. Compulsion would stem from the fact that everybody would be required to pay taxes regardless of whether or not he sought medical care. Cash sickness benefits refers to a system by which those covered would be entitled to weekly benefit payments in case of illness. The purpose is to make up partly for loss in wages or salaries during such time. A comprehensive system may offer both medical and hospital care as well as cash benefits, and there have been a few such proposals.

Behind the demand for compulsory systems of medical and hospital care or cash benefits, or both, is the belief that present medical treatment is inadequate; that this results in large losses that could be prevented; that an economic barrier exists between the needs of the average patient and the medical services available.[1]

However, more careful inquiry will reveal that the demand for compulsory health insurance has been more consistent and more pronounced in some states than in others. New York, for instance, has had no fewer than twenty-seven health insurance bills introduced in the legislature between 1935 and 1945. Yet New York has far better medical and hospital facilities, as well as provision for social services, than the average state. On the other hand, such states as Mississippi, Georgia, Alabama, Arkansas and the Carolinas, where the need for medical care is most acute, have practically no organized demand for compulsory health insurance.

Who then is responsible for the demand? Is it the sick and the poor who want it because they need it? Is it the government, trying to gain political benefit? Is it organized groups, such as industrial labor? Is it enterprise? What is behind the demand—social pressure, economic conditions, political interests? What is

1. The Debaters' Digest, May 1940.

the need for medical care and what its estimated cost? Is prevalent disease the only problem, or shall attention be given to potential illness? What are some of the basic factors that should be considered in a constructive health program?

How much is known about the actual conditions underlying our national health problem? Should a decision be made now or should more time be given to research and study? While this article cannot give the answers, it attempts to shed some light on the various problems in order that a better view may be obtained on the subject of compulsory health insurance.

HISTORY

The social reform movement early in the century played an important part in proposing state health insurance. It was supported by such "social reformers" as Louis D. Brandeis, associate justice of the Supreme Court of the United States; Lillian D. Wald, head of Henry Street Settlement, New York City; Charles R. Henderson, head of the Department of Practical Sociology, University of Chicago; Edward T. Devine, professor of social economy, Columbia University, and John B. Andrews, secretary of the American Association for Labor Legislation. Another group included economists such as John R. Commons, professor of economics, University of Wisconsin; Henry R. Seager, professor of political economy, Columbia University, and Joseph P. Chamberlain, professor of public law, Columbia University.

In 1910 the Russell Sage Foundation sent Frankel and Dawson to study European systems of social insurance. Their report did much to stimulate the movement in this country. In 1911 Brandeis advanced the idea of compulsory social insurance against sickness before the annual meeting of the National Conference on Charities and Corrections. The next year the American Association for Labor Legislation set up a Committee on Social Insurance. This committee, together with one from the American Medical Association, drafted a Model Sickness Insurance Bill in 1915, called the "Standard Bill." It was introduced in the Massachusetts, New Jersey and New York state legislatures.

During the 1915-1921 period, eleven legislative commissions were appointed to study and report on the proposal for state health insurance. Six of these—two from California and one each from Massachusetts, New Jersey, Ohio and Pennsylvania—submitted recommendations in favor of the proposed plan while five—from Illinois, Connecticut, Massachusetts, Pennsylvania and Wisconsin—reported unfavorably. Bills providing for state health insurance were introduced into the legislatures of fifteen states but were defeated in all cases. The "Standard Bill" passed the New York state senate but was defeated in the house. By 1921 the movement had practically ceased and little more was heard of it for over a decade.

In more recent years the first major event stimulating discussion of and proposals for compulsory health insurance was a publication in 1932 of the final reports of the Committee on the Costs of Medical Care. Composed of physicians, social scientists and laymen, this committee had begun its investigations in 1927 with funds provided by the Rockefeller Foundation, the Russell Sage Foundation and other organizations.

In 1934 the American Association for Labor Legislation sent circular letters to individuals over the country asking them to send telegrams to the Secretary of Labor and the President of the United States urging on them the need for state compulsory health insurance. The American Association for Social Security has been the chief sponsor of health insurance in the states. In 1935 it formulated the Model Bill, largely under the leadership of Abraham Epstein.

Since 1935 and including 1945, 102 bills have been introduced into the legislatures of twenty states, with success only in Rhode Island, in 1942. The passage of the National Social Security Act in 1935 was largely responsible for the increased activity. From then on the social insurance movement accelerated, with the subject of health insurance coming in for special consideration. The largest number of bills, previous to 1945, appeared in 1939, when the Wagner Bill was introduced in Congress.

HEALTH SURVEYS

The Committee on the Costs of Medical Care found that for an average day 2 per cent of the working population of the United States were disabled by sickness, with an annual wage loss of $1,000,000,000 in 1928-1929. The people of this country suffer from one to two disabling illnesses per person each year; female workers lose from eight to twelve days per year; male workers seven to nine days each year; school children average seven or more days of illness each year.

TABLE 1.—*Compulsory Health Insurance Bills Introduced in State Legislatures* *

State	1935-1944 (10 Years)	1945 (1 Year)	Total	Cultural Ranking (According to H. Odum)
New York	22	5	27	4
California	7	11	18	1
Massachusetts	6	7	13	2
Rhode Island	9	..	9	12
Connecticut	5	2	7	3
Washington	3	2	5	8
Pennsylvania	4	..	4	17
Wisconsin	3	1	4	15
New Hampshire	2	..	2	23
Colorado	..	1	1	19
Illinois	1	..	1	6
Michigan	1	2	3	7
Minnesota	..	1	1	14
Montana	..	1	1	29
Nebraska	1	..	1	13
New Jersey	..	1	1	10
New Mexico	..	1	1	38
Nevada	..	1	1	9
Ohio	1	..	1	20
Oregon	1	..	1	5
Total	66	36	102	

* As of April 22, 1945.
Source: Research Council for Economic Security, Chicago 3.

This table illustrates the rising trend in the number of compulsory health insurance bills introduced in state legislatures. While in the ten year period from 1935 to 1944 the total number of such bills amounted to sixty-six, the current year has seen no fewer than thirty-six bills introduced in state legislatures. An interesting sidelight is provided by the fact that the states ranking highest in cultural traits, that is, in economic and social development, boast the largest number of health insurance bills.

Distribution of services was unequal. Lacking in rural areas, towns and small cities, it was also unevenly distributed among individuals and classes. The 10.3 per cent of the population suffering the largest amount of sickness paid 41.2 per cent of total costs of medical services. The committee concluded that under existing methods of payment it is impossible for 99 per cent of families to set aside a reasonable reserve for medical expense.

Another survey was conducted by the United States Public Health Service in 1935-1936. It aroused much discussion and was partly responsible for the National Health Conference in 1938, composed of 170 delegates

from labor, farming, industry, civic clubs, social work, public welfare, medicine, nursing and hospitals.

The comparison summarized in table 2 shows some of the difficulties encountered in the investigation of the need for and cost of medical care. There is wide differentiation between the income groups, the number

TABLE 2.—*Comparative Summary of Health Surveys in the United States on Sickness and Medical Care*

	California Medical Economic Survey 1933-34	Committee on Costs of Medical Care 1928-31	National Health Survey 1935-36	U. S. Public Health Survey 1928-31
Illnesses per thousand of population	928 Income $1,200-$1,999	910 Income $1,200-$1,999	Not given	823
Disabling illnesses per thousand	492 Income $1,200-$1,999	488	172 7 days and over	492
Hospitalized illnesses per thousand	85 Income $600-$1,199	62 Income $1,200-less	46.7	59
Average days of disabling illness per person	16.30 Males	6.40 Income $1,200-$1,999	9.83	7.70
Cost of medical care per person	$24.33	$22.58	$16.00	Not given
Cost of medical care per family	$79.25	$89.53	$64.00	Not given
Per cent of illnesses receiving medical care	73.9 Income $1,200-$1,999	71.4 Income $1,200-$1,999	81.0	Not given

of hospitalized illnesses, the average days of disabling illness and the cost of medical care. Although four careful surveys have been made, they have not yielded conclusive evidence of the size or definite knowledge of the nature of our national health problem.

PRIVATE PROTECTION

Moreover, these surveys hardly take into consideration two major causes for the increasing demand for compulsory health insurance: first the progress of medical science, second the development of private insurance.

The American medical miracle increased the life span by about fifteen years between 1900 and 1944. New remedies and public health measures have reduced substantially the death rate from typhoid, scarlet fever, whooping cough, tuberculosis, dysentery and malaria, diarrhea and many other diseases. "Without such advances, these nine diseases alone would have taken ten times more American lives during the past forty years than were lost by all the United States armies during our entire history, until 1941." [2] These achievements have been publicized widely and have no doubt been appropriated by the thinking of every individual. From the knowledge of it the demand for modern medical services has been but a small step.

Social insurance probably would not have appeared so conspicuously on the field of social reform had the general concept of insurance not been developed greatly and become known more widely during the last twenty years. The introduction of group insurance, the supplementing of old age and survivors' insurance, the idea of social budgeting have contributed substantially to a greater appreciation of the principle of insurance. Accompanying charts show the amazing growth of such services as health and accident insurance (chart 1) and Blue Cross plans (chart 2) during the last decade. According to the Health and Accident Underwriters Conference, at the end of 1944 more than 40,000,000 persons were covered under some form of health and accident insurance, a fivefold increase over 1934, when about 8,000,000 people were insured. The increase in premium value has kept pace with the increase in coverage. From $69,000,000 in 1919, premium value increased to $525,000,000 in 1944, when benefit payments to policyholders increased in proportion.

Operating in forty-two states with a population of over 110 million, eighty-two Blue Cross plans have 17,500,000 members enrolled under 7,500,000 contracts. This is over 12 per cent of the total population, or nearly 16 per cent of the population in the states covered. It is estimated that hospitals with more than 90 per cent of all nongovernment beds are now enrolled in Blue Cross plans.

Another form of private protection is prepaid medical care, which covers at present between 4,000,000 and 5,000,000 people. Although much remains to be done in developing and perfecting this service, such states as Washington, Oregon, California and Michigan have between 9 and 16 per cent of their populations thus covered. A widely organized system of prepaid medical care would go far toward solving the medical part of our national health program.

Benefit payments on account of sickness and disability by national and international labor unions totaled about $50,000,000 between 1933 and 1944.[3] Fraternal societies have sickness benefit schemes in operation covering more than 4,000,000 members.

These are some of the forms of voluntary protection. Of course, there are many others, such as life insurance, soldiers' insurance, industrial pensions, community chests, homes for the aged, retirement funds, private savings including war bonds and workmen's compensation.

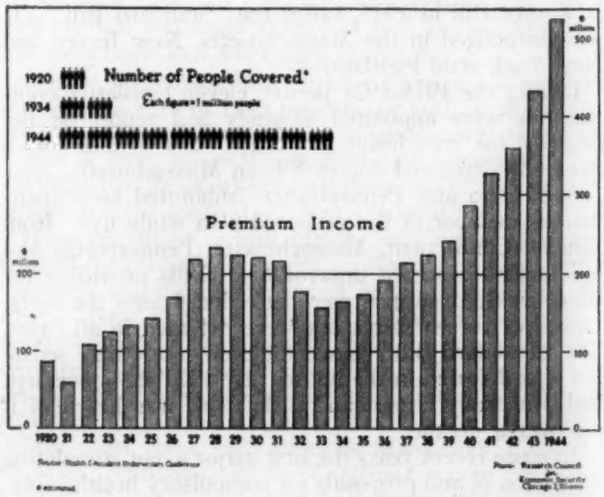

Chart 1.—Growth of health and accident business in the United States, 1920-1944.

It is probably no exaggeration to estimate the face value of all private protection close to the aggregate of our national wealth, i. e. in excess of $350,000,000,000. Although this estimate is bolstered by the favorable conditions of the present period of prosperity, it is still

2. Medical Care for Everybody? American Association of University Women, published in 1945.

3. Proceedings of American Federation of Labor Convention.

likely that even under less favorable conditions the total amount of private protection would not be less than $250,000,000,000.

Perhaps it would be natural to expect the demand for compulsory health insurance to go down as the amount of private insurance protection goes up. But this expectation is not fulfilled. Present trends do not

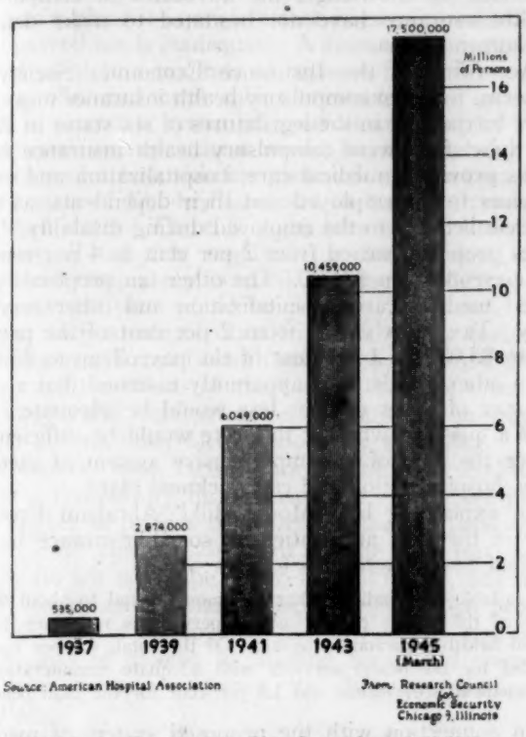

Chart 2.—Enrolment in Blue Cross plans, 1937-1945.

seem to support this contention. The demand for compulsory health insurance has never been louder or more insistent. Yet the amount of private protection has never been greater. The implication is that the demand is not guided primarily by the medical needs and that even a perfect system of private coverage would not still the demand for a compulsory system.

PUBLIC OPINION

While in the end the public will decide what form of health insurance the country shall have, in the actual debate the public has remained in the background. From the standpoint of organized expression it may be said that the line-up of groups favoring or opposing compulsory health insurance has changed little during the last thirty years. Generally in favor are organized labor, the reform groups, philanthropic organizations, the Social Security Board and other groups. Opponents to a comprehensive compulsory system of health insurance under federal administration are found among insurance companies, manufacturers, commercial organizations, the medical profession and those responsible for the entrepreneurial system and, beyond that, dependent in their operations on the principles of free and individual enterprise.

It is difficult to form an exact conclusion on what the public thinks of the problem of health insurance. Public opinion polls would indicate that the public favors health insurance. However, this depends on the form in which the question is submitted. If it emphasizes benefits, public opinion favors health insurance. But when the question emphasizes the financial cost, the necessary tax burden and the economic consequence in general, the public seems to be less sure about the desirability of a compulsory system.

That public thinking on the matter is closely allied with economic conditions is shown in the accompanying chart. The number of articles taken from the "Reader's Guide to Periodical Literature" from 1932 to 1944 shows that the interest in health insurance rises considerably in a period of depression and leads up to legislative action. This is clearly expressed in the line from 1933 to 1934, the peak of which is followed by enactment of the Social Security Act in 1935. Again, from 1937 to 1938 the line rises and leads up to the extension of the Social Security Act in 1939. Since we have had the Beveridge plan, the Delano Report, the Wagner-Murray-Dingell Bill, and other recommendations for social security legislation, the line is rising without a break.

NEED FOR MEDICAL CARE

Notwithstanding the large amount of voluntary protection against illness, there is no disagreement among the advocates of compulsory health insurance, as well as the opponents, as to the need for better medical care. The disagreement is about the form, the administration, coverage, benefits and many other details. Moreover, the term "need for medical care" is by no means understood alike by all concerned. For one thing, complete statistics on the extent of disease, prevalent and potential, are lacking in practically every one of the forty-eight states. For another, the need for medical care is relative, changing with economic circumstances, physical

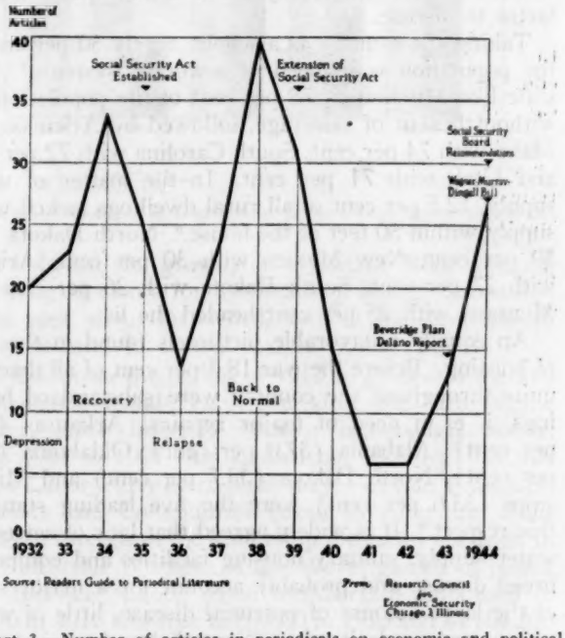

Chart 3.—Number of articles in periodicals on economic and political aspects of medical care, 1932-1944.

conditions and personal attitudes. A man working on a farm may think nothing of a cold that bothers him for a few days. He may keep right on working. In contrast, a woman living in the city may be bothered so much by a cold that she feels obliged to consult a physician or even go to a hospital. What is the absolute

need for medical care in the one case and in the other? Two persons suffering from the same kind of disease but possessing different degrees of intelligence may go about their treatment in different ways. The well informed man may seek medical consultation early and find relief quickly. Another may postpone action until his case not only requires a long period of hospitalization but invites complications calling for more elaborate and expensive treatment than was justified originally.

In addition to this problem which concerns the individual there are other problems which go beyond the personal aspects. The health problem differs in virtually every state. In California, communicable diseases account for a major share of reported illnesses. In 1940 chickenpox, whooping cough, mumps, measles and other contagious diseases accounted for about two thirds of all cases reported. In Mississippi influenza, syphilis, malaria, gonorrhea and dysentery are high on the list of reported illnesses. Mississippi's health problem is largely a Negro problem, with illness rates higher among Negroes than among white persons, and death rates from all diseases except cancer, heart disease and suicide between 20 and 50 per cent higher than those for white persons. In New York cancer, syphilis, tuberculosis and pneumonia are the important health problems. In Wisconsin, again, epidemic illness, chickenpox, measles and mumps claim the largest share of reported illnesses.

SANITATION AND HYGIENE

This contrast in leading causes of illness makes it difficult to analyze the health problem of our nation and makes it dangerous to generalize on the requirements for better medical care. But there is still another problem that should be given serious consideration. It is the lack of sanitation and hygiene as a major contributing factor to disease.

Taking the country as a whole, nearly 50 per cent of the population is in need of sewerage systems.[4] In a state like Mississippi, 78 per cent of the population are without benefit of sewerage, followed by Arkansas and Idaho with 74 per cent, South Carolina with 72 per cent and Utah with 71 per cent. In the matter of water supply, 12.5 per cent of all rural dwellings lacked water supply within 50 feet of the house.[5] North Dakota with 39 per cent, New Mexico with 30 per cent, Arizona with 27 per cent, South Dakota with 26 per cent and Montana with 25 per cent headed the list.

An equally unfavorable picture is found in the field of housing. Before the war 18.3 per cent of all dwelling units throughout the country were substandard buildings, i. e. in need of major repairs. Arkansas (39.1 per cent), Alabama (37.0 per cent), Oklahoma (34.5 per cent), North Dakota (33.7 per cent) and Mississippi (33.6 per cent) were the five leading states in this respect.[6] It is widely agreed that lack of sewerage, water supply, sanitary housing facilities and equipment breed disease and probably account for a major share of the large amount of potential disease, little of which is reported or dealt with. Nevertheless here is a very real and vital part of our national health problem which must be taken into consideration if a satisfactory and lasting solution of that problem is to be found.

4. National Inventory of Needs for Sanitation Facilities: III. Sewerage and Water Pollution Abatement, Pub. Health Rep. **59**: 857 (July 7) 1944.
5. Atkins, C. H.: National Inventory of Needs for Sanitation Facilities: Rural Sanitation, Pub. Health Rep. **59**: 969 (July 28) 1944.
6. U. S. Census, Housing, 1940, vol. 2, p. 73.

COST

Even if the exact nature and extent of the need for medical care were known, it still would not be enough to set up a definite health insurance program. The next step would be to ascertain the cost of a program developed from this information. Obviously, since the exact need is not known, neither can be the cost. In spite of this lack of knowledge, the advocates of compulsory health insurance have not hesitated to make definite recommendations.

According to the Insurance Economics Society of America fourteen compulsory health insurance measures were introduced in the legislatures of six states in 1945. Of these, four were compulsory health insurance measures providing medical care, hospitalization and other services to the employed and their dependents, as well as cash benefits to the employed during disability. Tax rates proposed varied from 2 per cent to 4 per cent of the payroll up to $3,000. The other ten proposals provided medical care, hospitalization and other services only. Tax rates varied from 2 per cent of the payroll up to $3,000 to 3 per cent of the payroll up to $5,000.

In other words, it is apparently assumed that a payroll tax of 3 per cent or less would be adequate. But it is a question whether this rate would be sufficient to cover the cost of a comprehensive system of medical care, hospitalization and cash sickness plans.

In explaining his "Model Bill," Abraham Epstein, one of the best authorities on social insurance in the United States, wrote as follows:

> Available data indicate that an amount equal to about 6 per cent of the wages of all insured persons is necessary for a sound health insurance program. Of the total, 4.5 per cent is needed for the health services with adequate remuneration to the medical professions, and 1.5 per cent for the cash benefits.

In connection with the proposed system of medical and hospital insurance in California, the California State Chamber of Commerce estimated "that the cost of care which would be made available under the governor's bill would require an average expenditure of 4.5 per cent of income."[7]

The Heller Committee of the University of California, which made detailed studies of incomes and expenditures of families in the Bay Region, estimated that a minimum of 5 per cent of income is needed for medical service even if such service is purchased at minimum cost through a group prepayment plan.

In Mississippi the cost of compulsory health insurance as of 1940 has been estimated by the Research Council for Economic Security at about $29,000,000 a year. This would require a tax of more than 6 per cent of all income payments received by the people in the state. If administrative costs were added, a tax of 7 per cent would probably be necessary.

In New York State, which has a comparatively high per capita income, it is estimated that a 5 per cent payroll tax would come close to financing a system of compulsory health insurance. However, if the cost of medical services should be higher than when the individual bears the cost himself, a 6 per cent tax would probably be necessary.[8]

Legislative bills in Wisconsin proposed a 4 per cent tax with which to finance a compulsory health insurance system. Before the war this rate would have yielded $28,000,000. If 10 per cent should be allowed for administrative costs and 5 per cent for reserve, the net

7. Health Insurance for California? February 1945, p. 26.
8. Research Council for Economic Security.

amount available for benefit payments would be about $23,000,000. In contrast, the amount needed for benefits in 1940, on the basis of a $20 annual medical cost per person, would have been over $32,000,000. Apparently a tax rate of between 5.5 and 6 per cent would be required to finance a comprehensive health insurance plan.[8]

From this brief survey of the cost of proposed health insurance plans it is evident that in most cases a 3 per cent payroll tax is inadequate. A more realistic appraisal would point to a tax rate of between 5 and 7 per cent of payrolls, and even this rate would only be sufficient to finance a system of medical and hospital care. Additional appropriations would be required for the financing of a cash sickness plan such as is in operation in the state of Rhode Island and as has been proposed in other states. There is good reason to believe that the payroll tax rate required for the financing of a system of compulsory hospital and medical care plus a cash sickness plan would be close to 7 per cent. It is against such a rate of taxation that the true cost of a compulsory system of health insurance should be determined and the effects of that cost on the state economy, on wages and enterprise, on investment, on buying power and on other factors should be evaluated.

Moreover, cost factors are elastic. Expenditures under a compulsory health insurance system are probably higher in periods of depression than of prosperity. When employment is abundant and the wage level high, people do not take time out to be sick unless they have to; it loses them substantial income. But when people, through lack of employment and low wages, risk little or no loss of income by staying home and claiming health or sickness insurance, the claim rate rises substantially.

Experience both at home and abroad shows that the claim rate goes up as prosperity goes down. This is not to imply that people submit claims under false pretenses. However, it is a statistical record, viz. the recent history of the Cash Sickness Plan in Rhode Island as well as the much longer experience of compulsory health insurance in Germany, Great Britain and other countries; also in the public works experience in our own country during the thirties that people take advantage of benefits offered under a compulsory system. If the records do not necessarily indicate that people claim benefits to which they are not entitled, nevertheless they show that "opinionated sickness" makes for a tremendous cost of compulsory health insurance. No doubt this trend is, at least in part, responsible for the fact that in Germany expenditures of the compulsory sickness insurance system rose from 12.16 reichsmarks per member in 1885 to 93.64 reichsmarks in 1939, while in Great Britain they rose from £0/17/10 in 1912 to £2/6/- in 1927. There is little reason to assume that a compulsory system of health insurance in our own country or in any state would not follow a similar pattern.

It is a dangerous practice to rely too much on a fixed rate of taxation. While a rate can be fixed, the amount of revenue cannot. A 3 per cent payroll tax levied under conditions of full employment and high wages yields a return substantially larger than the same tax would yield in a period of widespread unemployment and low wages. In determining revenue one must bear close watch on the wide fluctuations of economic activity in general and of unemployment and wages in particular.

THE PART OF LABOR

Our national health problem, then, is not a simple one. However, the various difficulties have not deterred the interested parties from advancing their compulsory health insurance proposals at every opportunity, in the belief that this will go a long way toward solving that problem. In doing so perhaps they have not been guided primarily by the need for medical care or the cost or the fact that there exists a good deal of voluntary protection. Apparently other considerations have played a decisive part in the demand for compulsory health insurance. Where does that demand originate? And what are the times and conditions most conducive to it?

Periods of depression which influence the demand for compulsory health insurance also contribute greatly to the growth of organized labor. Within ten years, membership in the two leading unions, the American Federation of Labor and the Congress of Industrial Organizations, has risen from less than 3,000,000 to more than 13,000,000 (chart 4). Does a connection

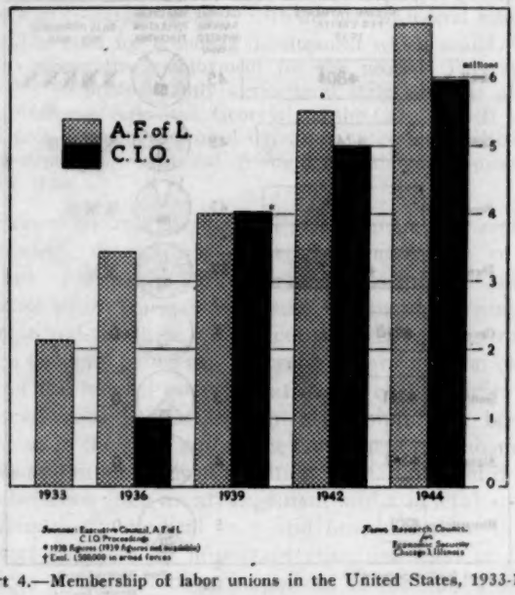

Chart 4.—Membership of labor unions in the United States, 1933-1944.

exist between the growth of organized labor and the increasing demand for compulsory health insurance? If the idea seems farfetched, look at the development of the demand in several states.

In California the period of 1912 to 1920 was marked by economic instability. Soon after the turn of the century, labor interests became increasingly active. From 1901 to 1907, and again from 1909 to 1911, the Union Labor Party elected the mayor of San Francisco. Socialists and Communists began to enter the labor unions in force, and the leadership inclined to be radical. The Industrial Workers of the World gained in power and influence. Labor union membership amounted to 45,000 in 1910 and rose to 69,000 in 1915 and to 104,200 in 1920. Beginning with the Initiative and Referendum Act in 1911, social legislation continued to increase, with four major social welfare acts adopted in 1913.

The depression, beginning in 1929, struck California severely. The index of employment declined from 100 in 1929 to 75 in 1931 and to 62 in 1934. A considerable burden was added to the state economy by the large migration of victims of the depression from other

states. Between 1932 and 1936, it is estimated, no fewer than 300,000 migrants entered the state.

Labor union membership, which at the beginning of the depression had difficulty holding its own, increased rapidly from 1935 on. In that year it amounted to 102,000 but by 1940 had climbed to 650,000. The period of depression was characterized by the severity of organized strikes. The Cannery and Industrial Workers Union struck in 1933, and the following year the International Longshoremen's Union called a strike in San Francisco with 25,000 workers involved. Socialist and Communist influence was strongly felt, especially in the Democratic party, which, under the leadership of Governor Olson, sponsored the compulsory health insurance proposals of 1939. Between 1929 and 1936 four important social welfare acts were passed by the state legislature. One group of which all political leaders must take account in California is that of the aged, who during the last twenty years or more have proved a most powerful source of political activity.

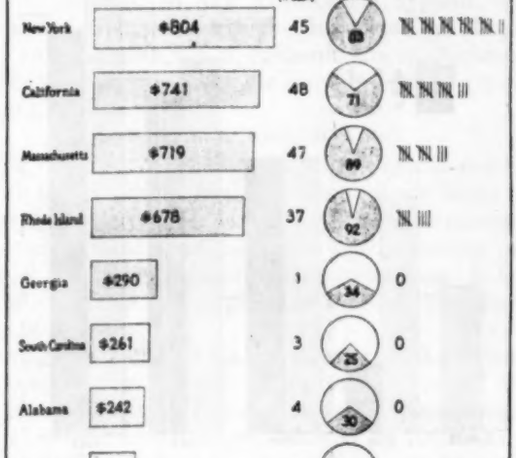

Chart 5.—Economic and social progress versus the demand for health insurance.

All these groups, the unions, the aged, the Socialists, the Communists, combined to create, between 1933 and 1938, some of the most flamboyant and utopian proposals that have ever appeared on the American scene. In 1933 the Utopian Society advocated a perfect society to the slogan of "A New Economy of Abundance." In 1933-1934 cooperative groups and societies expanded considerably, culminating in the barter scheme of "Tradex." Technocracy in 1934 came out with a highly artificial scheme of technology and finance. Between 1934 and 1936 the E. P. I. C. scheme advocating state socialism flourished, nominating a candidate for governor. Launched in 1934, the Townsend movement proposed a monthly payment to the aged. The "Ham-and-Eggs" movement proposed a weekly bonus, polling 1,000,000 votes in the 1938 election.

New York State has seen perhaps more attempts to introduce compulsory health insurance than any other state. During the last decade twenty-seven bills have been presented in the state legis'ature. The location of the national headquarters of many reform organizations in New York City has been probably responsible for this activity. But the strongest proponent has been the New York State Federation of Labor. In 1935 it had 850,000 members—exclusive of the four railway brotherhoods—organized in eight hundred unions, city labor bodies and district trade councils. About 55 per cent of the membership is in New York City. The State Federation maintains a permanent legislative committee, which works with about twenty labor newspapers throughout the state. In recent years the C. I. O. has entered the scene with equally vigorous activity.

In contrast to California and New York, Mississippi has seen little demand for compulsory health insurance in spite of the obvious need for better medical care. No bills calling for state health insurance have appeared in the legislature, nor has any organized group advocated such action. Standard social legislation such as has appeared in other states has not been enacted in Mississippi. If there had been any organized groups or labor unions in the state there probably would have been more legislative activity favoring compulsory health insurance. The absence of labor or group action is due to the weakness of organized labor. There are only a few local unions. The American Federation of Labor has no state branch.

As may be seen from comparison between the highly vocal demand for compulsory health insurance in California and New York, on the one side, and the absence of any organized demand in Mississippi, on the other (chart 5), certain conditions help or hinder the development of such a demand. These conditions make themselves felt regardless of prosperity or depression, being a result of the state's economic and social development. In Mississippi, for instance, a predominantly rural state with a large Negro population, conditions do not favor the organization of groups or unions, even with the stimulus that comes from a period of depression. In California and New York, however, conditions always favor collective action, even in times of prosperity.

FACTORS CONDUCIVE TO DEMAND

California's population is 71 per cent urban, the state having seven cities with a prewar population of 100,000 or over. This makes for congregation and collective action. With its nearly 300,000 wage earners in manufacturing industries (1939) it ranks among the ten leading states. This facilitates labor organization. In addition, since 1940 about 1,300,000 newcomers have settled in California, working mostly in shipyards, aircraft factories and other industries.

With a per capita income of $741 in 1939, against a national average of $539, California is one of the wealthiest states in the Union. This makes for extensive development of modern medical service and equipment and spurs the appetite for even better facilities. Finally, California's population is marked by a high degree of mobility caused by five principal factors: extensive foreign trade, large tourist movement, influx of migratory workers, the climate attracting many older people and the lure of Hollywood. This mobility makes for novel, sometimes startling, economic ideas and social experimentation.

New York has likewise an abundance of factors conducive to the demand for compulsory health insurance. In view of the fact that New York has by far the largest number of manufacturing establishments and of wage

earners, as well as the highest amount of wages and products, it is no surprise that labor organization is perhaps more highly developed in this than in any other state. In urban development New York ranks high, having twelve cities with over 100,000 population (1940). New York City, especially, probably yields more instances of collective action and pressure than any other city.

In per capita wealth New York outranks every other state with the exception of New Jersey. Accordingly, medical services and facilities have been developed to the highest degree and in turn have provoked the desire for still further improvements. Finally, the state has the most cosmopolitan population of any state. Before the war less than 80 per cent of its population was native born against more than 90 per cent for the country as a whole. The substantial share of foreign population, apart from the large proportion of first generation Americans, is undoubtedly responsible for the introduction of many social ideas partly copied from foreign countries. Mississippi is the antithesis for both California and New York. In industrial development it ranks among the lowest of all the states. There are virtually no large cities; hence there is little opportunity for mass action. In per capita income it stands at the very bottom. Therefore the development of medical facilities compares unfavorably with that of other states and is largely dependent on out of state help. Owing to the absence of industrial wealth and opportunity and with a population half white, half Negro, few foreign ideas enter the state, and those that do are instantly discouraged.

CONCLUSIONS

The demand for compulsory health insurance, it may be concluded, is promoted most powerfully by organized collective action, especially by organized labor. However, the opportunity for such action is not always present. It is easier to organize in depression than in prosperity, easier in industrial than in agricultural states, easier in large cities than in small towns, easier in areas where medical service and facilities are well organized.

We are then in a position to summarize as follows:

The most powerful single force responsible for the origin of the demand for compulsory health insurance is organized labor.

The time most conducive for this demand is a period of depression.

The place most conducive for formulation and pressing of such demand is the large city.

Apparently, the opportunity to organize the demand is more important than the prevalence of the need for medical care. The evidence points to the probability that, contrary to popular belief, the legislative proposals for compulsory health insurance are based not so much on social needs as on political interests, and that the ability on the part of labor to organize and press the demand, rather than the concern about the state of health, is the primary consideration.

Organized labor is strongest in the most highly industrialized and urbanized sections of the country. It is only natural that labor-promoted plans for compulsory health insurance are designed chiefly in the interests of industrial labor and are modeled to fit the conditions prevailing in highly developed areas. But these conditions are not typical of the country at large, nor are they the major part of our national health problem. Therefore it may be said that such plans hardly promise an adequate solution of that problem, which is made up of many different factors apart from those that characterize conditions in the large cities.

Illness apparently is not chiefly responsible for the demand for compulsory health insurance. If it were, recommendations would start in the medically least progressive states. However, they originate at the opposite end of the scale, where medical care and social services are most highly developed. The proposed recommendations do not and apparently are not designed primarily to solve the health problems in rural areas, economically underdeveloped regions and among underprivileged groups.

There are three principal aspects of our national health problem:

(*a*) The need for medical care and hospital facilities where none now exist. This is largely a problem of constructing hospitals and of organizing medical services, both of which could probably be realized more effectively on a state or local than on a federal scale.

(*b*) The need for better sanitation and hygiene. This is chiefly a public health project and one for state and local government to put into operation, probably with the help of federal subsidies.

(*c*) The need for economic development which would enable more remunerative employment for the people. This applies especially to predominantly agricultural states such as Mississippi, Alabama, Arkansas, Georgia and the Carolinas. It would mean crop rotation, improved irrigation, more industrialization, better education, vocational training and the development of foreign trade.

How, then, can the federal government cooperate in improving, directly or indirectly, the health of the people? The health problems of Mississippi are similar to those of Arkansas, Missouri, Kentucky, Tennessee, Georgia and Alabama. They constitute a regional rather than a national problem. Therefore, participation on the part of the federal government may well be confined to financial subsidies, of which Mississippi has been a recipient in the past, and to the construction of hospitals, clinics and other medical facilities. The important difference between such an arrangement and a federal system of compulsory medical care and hospitalization lies in the fact that the all important administration of these services would not be monopolized in the hands of the federal government but could be assumed by private enterprise and, if needed, by local government units. A voluntary setup, while making full use of federal resources, would neither interfere with the health and medical conditions in other states nor attempt to impose on a state like Mississippi provisions and benefits adapted to urbanized and industrialized regions and not designed for the special conditions of the agricultural South.

State and local authorities can give full consideration to local requirements, whereas the federal government cannot. Moreover, the authority of the state would be limited as against the practically unlimited power of government authority if administration of social services was concentrated in federal hands. Finally, a compulsory system of health insurance would be kept within the limited resources of the state, with regard both to cost and to political exploitation, whereas it would be virtually without limitation on a federal basis. If necessary, the restricted financial resources of the state could be supplemented by federal aid.

Previous pages have indicated the growth in volume and extent of protection provided by private

enterprise. No doubt this could be further promoted by common and concerted action among the various carriers—insurance companies, medical organizations, nonprofit hospital plans, industrial societies and mutual benefit associations. There is little reason to doubt that an agreement on collective action would go far in making possible extended protection against sickness at substantially lower cost than is possible under separate plans.

All these considerations emphasize the need for careful deliberation with regard to current or contemplated proposals for compulsory health insurance. Another important factor is the lack of factual comprehensive information. In view of the absence of specific data as to the exact need for medical care, any legislative proposal could hardly be based on anything more substantial than general ideas obtained from overall estimates. As a result, benefits are not determined on local requirements. The exact cost is not known. The rate of taxation cannot be fixed with any degree of accuracy. A reliable and complete survey of the health problem of the states and of the nation has never been made. Until it is made, and until more information is available, not only as to the cost of compulsory systems but of the effect on such widely divergent factors as government, taxes, enterprise and human nature, care should be taken by the citizen and his legal representatives to weigh carefully the pros and cons before they decide what they want in the way of health insurance for themselves, for their children, for their state and for their nation.

176 West Adams Street.

Council on Physical Medicine

The Council on Physical Medicine has authorized publication of the following reports. HOWARD A. CARTER, *Secretary.*

"AN APPRECIATION"

The Council on Physical Medicine desires to take this opportunity to express its feelings of gratitude and appreciation for the services of the following consultants, whose assistance in carrying out the work of the Council has been given so freely during the past year: Drs. Milton B. Cohen, Clement J. De Bere, Hart Fisher, K. G. Hansson, John S. Hibben, Alexander Hollaender, Arno B. Luckhardt, S. L. Osborne, Perry Pepper, Scott M. Reger, Bernard D. Ross, Henry Schwerma, Ralph Waters and W. F. Wells.

Audiometers and Hearing Aids.—Drs. Gordon Berry, E. P. Fowler, W. E. Grove, Isaac Jones, Dean Lierle, Moses Lurie, Douglas Macfarlan, C. Stewart Nash, Horace Newhart, Paul Sabine and B. R. Shurly.

Educational Work.—Drs. Frances Baker, Robert L. Bennett, Benjamin Boynton, Earl C. Elkins, F. H. Ewerhardt, Richard Kovacs, Fred B. Moor, W. H. Northway, William Schmidt and Walter M. Solomon (in service).

Ophthalmic Devices.—Drs. Thomas D. Allen, Charles A. Bahn, S. Judd Beach, Conrad Berens, Frederick Carl Cordes, Alfred Cowan, L. T. Post and Avery C. Prangen.

Artificial Limbs.—Drs. Harry E. Mock, S. Perry Rogers, Paul Steele and Philip Wilson; Messrs. McCarthy Hanger Sr., W. E. Isle, J. B. Korrady, Joseph Spievak and David E. Stolpe.

Respirators.—Drs. Walter B. Cannon, Edward L. Compere, Charles McKhann and James Wilson.

Electrocardiographs.—Drs. A. R. Barnes, George Fahr, Harold E. B. Pardee, William D. Stroud, Carl J. Wiggers and Frank H. Wilson.

Roentgen Therapy.—Drs. William Edward Chamberlain, Arthur Carlisle Christie, Edwin Charles Ernst, Gioacchino Failla, Fred Murchison Hodges, John Thomas Murphy, deceased, Robert Reid Newell, Eugene Percival Pendergrass, Ursus Victor Portmann, Lauriston S. Taylor and J. L. Weatherwax.

Contraceptive Devices.—Drs. Nicholson J. Eastman, William W. Greulich, Lieut. Comdr. Joseph Hughes, Dr. A. C. Ivy, Prof. Walter J. Méek and Dr. Ephraim Shorr.

Occupational Therapy.—Drs. Raymond Allen, Winfred Overholser, Col. Howard A. Rusk, Drs. William Stroud and Francis Trudeau.

YOUNG RECTAL DILATORS NOT ACCEPTABLE

Manufacturer: F. E. Young & Company, Chicago.

The Young Rectal Dilators consist of plugs of graded sizes designed to stretch the external sphincter muscle of the anus. They are made of a plastic material.

The Dilators are intended to be used by the patient following the instruction of a physician. The firm claims the Dilators are useful in the treatment of chronic constipation and that they are sold only on a physician's prescription.

The firm submitted a list of physicians who have had experience with the Dilators and also eighteen letters from physicians who have prescribed the device. The evidence presented in these letters is merely a description of the writer's experience and is devoid of scientifically controlled data.

The Council's investigator reported that the Young Rectal Dilators were dangerous and that they are likely to cause harmful effects when used by the patient. Examination of the information which the firm submitted does not reveal acceptable scientific evidence to substantiate their value. The Council voted, therefore, not to accept the Young Rectal Dilators, because of the lack of adequate evidence of their therapeutic efficacy.

PARAVOX MODEL VV2 RADIO TUBE HEARING AID ACCEPTABLE

Manufacturer: Paraphone Hearing Aid Company, Inc., 2056 East Fourth Street, Cleveland 15.

The Paravox Model VV2 is a two tube instrument with transmitter, amplifier and batteries in one case. A single cord attaches to the case, connected to which is a crystal receiver.

Physical dimensions:

Case: 5 1/16 by 2 9/16 by 1 1/8 inches.

Receiver: Either 1 inch diameter or 3/4 inch diameter crystal.

Weight: Case (containing batteries, transmitter and amplifier) 11 ounces.

Current consumption:

A battery (1½ volts) 68 milliamperes.

B battery (30 volts) 0.5 milliampere.

Battery drain is independent of volume control setting.

Acoustical gain for speech: With 1 inch diameter crystal receiver and full volume, 31 decibels. This gain represents the average gain for 3 persons, each of whom had losses of from 40 to 50 decibels for air conduction from 256 to 2,048 cycles. These persons perceived speech through a high quality sound system at an average level of 31 decibels less intensity with the hearing aid than without it.

Acoustical gain for pure tones:

Frequency.....	250	500	1,000	2,000	3,000	4,000	5,000
Full gain in decibels (large receiver)....	16	30	42	43	34	26	3

These measurements were obtained with an artificial ear. The hearing aid was mounted on a body baffle. The foregoing values do not indicate absolute sound pressure values but indicate the amplification efficiency of the instrument at the frequency levels shown.

Physical and mechanical features: The amplifier and batteries are contained in a single case of black enameled metal. The combined volume and "on-off" switch consists of a knurled disk at the top of the case. The case is slightly larger and heavier than the conventional tube hearing aid transmitter case, since it also contains the batteries. The total weight is less than that of the conventional instrument, which has separate cases for the transmitter and batteries.

Performance: This instrument operates in an entirely satisfactory manner. There is a minimum of inherent amplifier, case and cord noise.

Recommendation: The Council on Physical Medicine voted to include the Paravox Model VV2 Radio Tube Hearing Aid in its list of accepted devices.

PARAVOX MODEL VV3 RADIO TUBE HEARING AID ACCEPTABLE

Manufacturer: Paraphone Hearing Aid Company, Inc., 2056 East Fourth Street, Cleveland 15.

The Paravox Model VV3 is a three tube instrument with transmitter, amplifier and batteries in one case. A single cord attaches to the case, connecting to a crystal receiver.

Physical dimensions:

Case: 5 1/16 by 2 5/16 by 1 1/8 inches.
Receiver: Either 1 inch diameter or 3/4 inch diameter crystal.
Weight: Case (containing batteries, transmitter and amplifier) 11 ounces.

Current consumption:

A battery (1½ volts) 65 milliamperes.
B battery (30 volts) 0.6 milliampere.
Battery drain is independent of volume control setting.

Acoustical gain for speech: With 1 inch diameter crystal receiver and full volume, 44 decibels. This gain represents the average gain for 3 persons, each of whom had losses of from 40 to 50 decibels for air conduction from 256 to 2,048 cycles. These persons perceived speech through a high quality sound system at an average level of 44 decibels less intensity with hearing aid than without it.

Acoustical gain for pure tones:

Frequency.....	250	500	1,000	2,000	3,000	4,000	5,000	6,000
Full gain in decibels (large receiver)....	29	46	51	55	46	45	29	11

These measurements were obtained with an artificial ear. The instrument was mounted on a body baffle. The foregoing values do not indicate absolute sound pressure values but indicate the amplification efficacy of the instrument at the frequency levels shown.

Paravox Model VV3 Hearing Aid

Physical and mechanical features: The amplifier and batteries are contained in a single metal case, finished with smooth black enamel. The combined volume control and "on-off" switch consists of a knurled disk at the top of the case. The case is slightly larger and heavier than the conventional tube hearing aid transmitter case, since it also contains the batteries. The total weight is less than that of the conventional instrument, which has separate cases for the transmitter and batteries. The 1½ volt A battery (small or size C flashlight battery) and the 30 volt B battery (special small size hearing aid battery) cannot give as many hours of service as can be anticipated from the larger size batteries usually used with three tube instruments.

Performance: The Paravox Model VV3 operates in an entirely satisfactory manner. There is a minimum of inherent amplifier, case and cord noise.

Recommendation: The Council on Physical Medicine voted to include the Paravox Model VV3 Radio Tube Hearing Aid in its list of accepted devices.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES-1945 OUT IN AUGUST

Considerable delay has been experienced in preparing the bound volume of New and Nonofficial Remedies-1945. The printing of the final forms is now in progress, and, when the binders have finished, the book will be available, it is hoped, some time in August. Difficulty in procuring paper, scarcity of personnel and other causes have contributed to this unavoidable delay. It is especially regretted that these circumstances have postponed the distribution of the paper bound copies which are given each year to one class of each accredited medical school.

NEW AND NONOFFICIAL REMEDIES

The following additional articles have been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the rules on which the Council bases its actions will be sent on application.

AUSTIN SMITH, M.D., *Secretary.*

SCARLET FEVER STREPTOCOCCUS TOXIN, TANNIC ACID PRECIPITATED.—A sterile buffered solution containing in suspension a tannic acid precipitate of scarlet fever toxin and 0.4 per cent phenol as a preservative.

Actions and Uses.—This tannic acid precipitated toxin is claimed to permit slower absorption and a prolonged antigenic stimulus which permits a reduction in the amount of toxin and size of dose as compared with former methods of immunization.

Dosage.—Children receive three intracutaneous injections of 0.1 cc. (dose 1, 750 STD/0.1 cc.; dose 2, 3,000 STD/0.1 cc.; dose 3, 10,000 STD/0.1 cc.) at two week intervals. Some may need a supplemental dose after a four week interval.

Adults may receive 500, 2,000, 6,000 and 10,000 STD at two week intervals. Each vial should be well shaken before use. The toxin should not be used beyond expiration date on label or if it does not resuspend completely on shaking.

Preparation.—Scarlet fever toxin is prepared from cultures of hemolytic streptococcus, N Y-5 (Dochez) strain, and treated with ammonium sulfate. The ammonium sulfate precipitate is dissolved in sterile saline solution, buffered at p_H 6.6 and preserved with phenol. Samples of the toxin which meet the requirements of the National Institute of Health are further treated by the addition of sterile diluent and 0.5 per cent solution of tannic acid.

The tannic acid precipitated toxin is washed free of tannic acid and suspended in buffered saline solution containing 1 per cent acacia. The suspension is assayed for skin test dose potency and diluted suitably for market packaging. The finished product is preserved with 0.4 per cent phenol and complies with the requirements of the National Institute of Health of the United States Public Health Service.

WYETH INC., PHILADELPHIA

Scarlet Fever Streptococcus Toxin for Immunization, Tannic Acid Precipitated: 0.5 cc. single immunization vials and 2 cc. 10 immunization vials packaged in units of three vials (children) contains respectively in each 0.1 cc. 750, 3,000 and 10,000 skin test doses; and in units of four vials (adult) containing in each 0.1 cc. 500, 2,000, 6,000 and 10,000 skin test doses. Also 0.5 cc. single and 2 cc. ten dose vials containing a supplementary dose for children and adults, representing in each 0.1 cc. 10,000 skin test doses. Preserved with phenol 0.4 per cent.

COD LIVER OIL WITH VIOSTEROL (See New and Nonofficial Remedies, 1944, p. 630).

The following additional dosage form has been accepted:

MEAD JOHNSON & COMPANY, EVANSVILLE, IND.

Cod Liver Oil with Viosterol: 473 cc. Each 1 Gm. has a potency of not less than 1,800 U. S. P. units of vitamin A and of not less than 400 U. S. P. units of vitamin D.

PERCOMORPH LIVER OIL (See New and Nonofficial Remedies, 1944, p. 636).

The following additional dosage form has been accepted:

MEAD JOHNSON & COMPANY, EVANSVILLE, IND.

Capsules Oleum Percomorphum with Other Fish Liver Oils and Viosterol: 83 mg.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JULY 21, 1945

THE CONSTRUCTIVE PROGRAM FOR MEDICAL CARE

On June 22 the Council on Medical Service and Public Relations of the American Medical Association, meeting with the Board of Trustees, developed a program for the extension of health and medical care in the United States, published elsewhere in this issue. This program is so direct in its statements of objectives to be achieved that it requires little interpretation. By it the Association supports improvement in nutrition, housing and living conditions that are fundamental to good health. Again it places the American Medical Association behind the extension of qualified public health and preventive medical service. The program recognizes that plans for insurance against the costs of hospitalization on a voluntary basis have now been sufficiently developed to warrant support, although some controversial questions have not yet been satisfactorily settled. The care of the indigent, for which there are no suitable provisions under existing or proposed national or other compulsory sickness insurance plans, may by new technics be incorporated into voluntary sickness insurance plans.

Fundamental to a scientific plan for meeting needs for medical care is the scientific survey which determines the existence and scope of such needs. This fact is recognized in the proposals that surveys be made to determine these needs and that federal aid be given where needs are demonstrated, with the understanding that administration and control will be under local auspices. Scientific also is the proposal for continuous surveys of all plans leading toward their extension and improvement as new needs are shown.

The final measures in this program relate to problems associated with the war and the situations created by military service. More than 60,000 physicians have been involved in military and other government services, while less than 90,000 physicians have tried to meet the needs of the civilian population. On these civilian physicians has rested a great burden. Every one now agrees that discharge of physicians from the armed services as rapidly as possible is necessary for the maintenance of medical care of the quality that has prevailed in this country. Associated with such discharge must come relocation and redistribution of physicians, since the needs of various communities have been modified by conditions related to the war. Certainly the desires of the men who have given so greatly of themselves both to the men in the armed services and to the civilian population during the war years merit consideration. It would be unfair to force revolutionary changes in medical practice on these physicians while they are away from their homes and have not had opportunity to voice their opinions. This applies equally to the 12,000,000 men and women who have fought to preserve the American form of government.

The needs of medical education have been told repeatedly and are again emphasized in this constructive program. Unless plans provide for a sufficient number of young men and women in the premedical curriculum, the nation will face a desperate shortage of physicians in coming years, a shortage made more acute by increased demands of the armed forces and of various government agencies for trained physicians. The needs of the Veterans Administration for physicians will far exceed any demands ever made previously by that agency.

THE RELEASE OF MEDICAL OFFICERS FROM THE ARMED FORCES

Almost simultaneously with the coming of V-E day, physicians, as well as most other members of the armed forces, began to look forward to the day of their release from military service. The unrest inevitably associated with uncertainty as to the future was, of course, heightened by the sudden cessation of routine medical activities, so that many a physician chafed over being held in service without work to do. The dissatisfaction was further heightened when announcement of a system of release of men on a point system was made, yet without any statement as to the technic by which officers would be discharged from the service. More recently announcement has been made from the Office of the Surgeon General that from 2,000 to 3,000 physicians might be released by January 1946 or indeed that as many as 7,000 might be released by May 1946.

On July 11 Senator Johnson of Colorado accused the Army of taking a "leisurely attitude" toward release of physicians who are urgently needed for the civilian population. Other members of the Military Affairs Subcommittee also urged the Army to speed the release of physicians. Some dissatisfaction arises, as was indicated in a letter from five military medical officers published in The Journal last week, over the concept that the Army is not taking in any new young men but apparently will hold on as long as possible to those it already has. To these claims and charges the Army Medical Department replies that the European war

may be ended but there still remain the problems associated with the armies of occupation, the intensified war with Japan in the Pacific, the requirement that the sick and disabled be kept in the Army until they have reached maximum recovery, and medical routines associated with the discharge of men from the armed forces.

In a consideration of the questions associated with the discharge of British medical officers, the London *Lancet* points out that it was possible to invade France with a cover of less than 5 hospital beds for each hundred men but that it is necessary in the Far East, with "its long lines of communication, its abominable climates and its special risks from endemic and epidemic disease" to furnish 10 beds for every hundred troops and physicians and medical personnel to staff them.

The suggestion that young men who have recently completed internships and residencies be taken into the military service to replace older physicians now in the service is not wholly sound. This would not provide the Army with the highly specialized services that can be provided only by older men. The necessary peripheral nerve surgery, vascular surgery, plastic surgery and highly specialized diagnostic and therapeutic skills of internal medicine, psychiatry, dermatology and ophthalmology, for example, will not be made available by taking new young men into the service.

The physicians of the armed forces may be assured that every agency of the American Medical Association that can possibly be helpful is seriously engaged in this problem. The Committee on Postwar Medical Service, the Board of Trustees and all of the facilities of the headquarters office are doing their utmost to aid officers in the Office of the Surgeons General in solving problems related to the discharge of medical officers. Years were required for mobilizing the armies and medical services of our nation; release cannot be accomplished overnight.

OLEOMARGARINE

With the advent of war there has been a considerable decrease in edible fats available for civilian consumption. As a means for increasing the supply of solid edible fat to replace the decreasing amount of butter available for nonmilitary populations, margarine has been increasingly emphasized. Aside from the fact that this food has been fortified to the extent of 9,000 international units of vitamin A per pound to compensate for its lack of this vitamin, much discussion has concerned the nutritional value of fortified margarine as compared with butter fat. Various economic interests have been injected into this discussion, but only recently has objective evidence on the nutritional value of this fat been available.

Deuel and his associates [1] found that growing rats could use either butter fat, various vegetable fats or margarine with equal ease. The animals grew equally well, as shown by increase in weight and increase in bone length, whether their dietary fat consisted of butter fat or of margarine. In addition, Deuel [2] made careful analyses of the rats maintained on diets containing the various fats and found that there was no difference in the protein, lipid, ash or water content of the tissues of the animals. Then Elvehjem and his associates [3] showed that margarines permitted satisfactory growth in rats when the carbohydrate of the diet was glucose, sucrose, starch, dextrin or a mixture of them, whereas, when lactose was the sole carbohydrate of the diet, the rats grew better when butter or lard rather than oleomargarine was the fat used.

Deuel and his associates [4] studied the effect of different fats on fertility and lactation, since under these circumstances the dietary requirements constitute a more stringent test of nutritional adequacy than does growth. Difference was not found in the fertility of male or female rats on diets which contained various fats, irrespective of whether the fat was butter, margarine, corn, olive, peanut or soybean oils, provided the diets were supplemented with the proper fat soluble vitamins. All the diets produced young of equal weight at weaning, showing that they were equally efficacious in promoting lactation. These results would indicate that butter per se is not required for the growth or lactation of the rat. Perhaps then nutritional deficiency might occur in subsequent generations of animals whose diet was deficient in butter fat; a study [5] was carried out in which ten generations of rats were maintained on a diet containing margarine fortified with vitamin A in place of butter fat. Vegetable fats such as those used in margarine, the evidence proved, can serve adequately in place of butter fat in regard to growth, reproduction and lactation on a diet which would be otherwise nutritionally satisfactory.

The experimentalists in nutrition have shown that margarine may be substituted for butter fat with impunity in regard to growth, reproduction and lactation, provided the diet is nutritionally adequate. Of all the fat soluble vitamins, margarine is deficient in vitamin A, but this deficiency is made up by the fortification of the product with added vitamin A. This is a common procedure and most products on the market today are fortified in this way. The possibility of using margarine as a low cost fat may be of considerable importance in the feeding of the war seared population of Europe; it may also be used with safety in this country when a less costly edible fat is needed.

1. Deuel, Harry J., Jr.; Movitt, Eli; Hallman, Lois F., and Mattson, Fred: J. Nutrition **27**: 107 (Jan.) 1944.

2. Deuel, H. J.; Movitt, Eli; Hallman, Lois F., and Wu, E.: J. Nutrition **27**: 335 (April) 1944.

3. Boutwell, R. K.; Geyer, R. P.; Elvehjem, C. A., and Hart, E. B.: J. Nutrition **26**: 601 (Dec.) 1943.

4. Deuel, H. J.; Movitt, Eli, and Hallman, Lois F.: J. Nutrition **27**: 509 (June) 1944.

5. Deuel, H. J.; Hallman, Lois F., and Movitt, Eli: J. Nutrition **29**: 309 (May) 1945.

Current Comment

INFORMATION BULLETIN FOR MEDICAL OFFICERS READY

Information of special value to medical officers about to reenter civilian life has been published at frequent intervals in THE JOURNAL. Various agencies of the American Medical Association, including the Committee on Postwar Medical Service, the Bureau of Information, the Council on Medical Education and Hospitals and the Bureau of Legal Medicine and Legislation, have taken part in gathering this information. In order to make this material more readily available, the Bureau of Information has prepared a pamphlet entitled "Information Bulletin for Medical Officers," which contains a digest of the G. I. Bill of Rights, educational facilities in civilian institutions, aids in establishing a practice, licensure and reciprocity data and certification by specialty boards. This pamphlet is now ready for medical officers and through the courtesy of the Surgeons General of the Army, Navy and Public Health Service will be sent to all physicians in those services. A brief digest of this material cannot answer all the questions which may arise. It is indicated in the pamphlet, however, how additional information on specific problems may be obtained.

THE FACTORS UNDERLYING THE DEMAND FOR COMPULSORY SICKNESS INSURANCE

The article by Strow and Hirschfeld in this issue of THE JOURNAL is offered as a report of a scientific investigation into the forces now promoting the mechanism for medical service incorporated in the Wagner-Murray-Dingell bill. The analysis reveals that legislative proposals for compulsory health insurance are not based on actual investigation of needs; neither are they apparently founded on anything resembling exact measurement of the extent of illness and failure to receive medical care. Strow and Hirschfeld offer proof that the demand for compulsory sickness insurance arises in those sections of the country where medical care and social services are most highly developed and that the demand is associated with the activities of highly organized labor groups. The demand is urban rather than rural. This investigation shows further that the chief problems in providing adequate distribution of medical service and facilities for health is the construction of new hospitals, the improvement of sanitation and hygiene, the improvement of economic conditions and the organization of medical services around medical institutions. This scientific report coordinates well with the program for extension of medical services developed through the Council on Medical Service and Public Relations and the Board of Trustees of the American Medical Association, also published in this issue of THE JOURNAL. The report by Strow and Hirschfeld is not opposed to organized labor; rather it is offered specifically to organized labor for study so that cooperation may be secured in extending to the worker, to the farmer and to people generally the most that American medicine can give under a democratic system of government. Compulsory sickness insurance leads to regimentation and totalitarianism. The continued evolution of plans for medical care with the acceleration that has been evident in recent years will yield technics for providing medical service adapted to the American way of life.

PUBLICITY FROM THE COMMITTEE OF PHYSICIANS

The so-called Committee of Physicians for the Improvement of Medical Care, Inc., has been sending out bulletins again. Apparently little, if any, attention is given to them, since they receive little if any comment in either medical or lay periodicals. Many, if not most, of the members of this committee are full time teachers in our medical schools. The chief concern of Statement No. 15 seems to be the effect of proposed legislation on such teachers. One absolute falsehood demands correction. The statement says "Since the American Medical Association is uncompromising in its insistence upon fee-for-service payment, this system would undoubtedly be elected by 'the majority of the general medical practitioners.'" Even casual observation or reading would reveal that this statement is not true. The statement expresses great fear that the so-called teaching hospitals associated with medical schools might be forced under one clause of the Wagner-Murray-Dingell bill to become open hospitals. This, they say, "would destroy the present organization of clinical faculties and the possibility of controlling the quality of medical care." The final demand in their statement is "special provisions for the protection of educational institutions." The narrowness of the point of view of this group can now be clearly understood by the medical profession. The names of the committee are here repeated as published in Statement No. 15:

Channing Frothingham, chairman
Milton C. Winternitz and Carl Binger, vice chairmen
Russell L. Cecil, honorary chairman
John P. Peters, secretary and treasurer

Alf S. Alving	Harry S. Mackler
Bertram Bernheim	Irvine McQuarrie
Ernst P. Boas	J. H. Means
Samuel Bradbury	T. Grier Miller
Allan M. Butler	George R. Minot
Alexander M. Burgess	Fred D. Mott
Hugh Cabot	Robert B. Osgood
Louis Casamajor	Walter L. Palmer
Thomas B. Cooley	H. B. Richardson
Robert L. DeNormandie	G. Canby Robinson
Nathaniel Faxon	David Seegal
Charles A. Flood	Clement A. Smith
Maurice Fremont-Smith	Richard M. Smith
Harry Goldblatt	Joseph Stokes Jr.
F. T. H'Doubler	Borden S. Veeder
William J. Kerr	Allen O. Whipple
H. Clifford Loos	James L. Wilson
F. D. W. Lukens	W. Barry Wood Jr.
George M. Mackenzie	Edward L. Young

One wonders how many of them read or understood the purport of Dr. John Peters' latest revelation.

CONSTRUCTIVE PROGRAM FOR MEDICAL CARE

AMERICAN MEDICAL ASSOCIATION

This platform was adopted by the Council on Medical Service and Public Relations and the Board of Trustees of the American Medical Association on June 22, 1945.

Preamble

The physicians of the United States are interested in extending to all people in all communities the best possible medical care. The Constitution of the United States, the Bill of Rights and the "American Way of Life" are diametrically opposed to regimentation or any form of totalitarianism. According to available evidence in surveys, most of the American people are not interested in testing in the United States experiments in medical care which have already failed in regimented countries.

The physicians of the United States, through the American Medical Association, have stressed repeatedly the necessity for extending to all corners of this great country the availability of aids for diagnosis and treatment, so that dependency will be minimized and independence will be stimulated. American private enterprise has won and is winning the greatest war in the world's history. Private enterprise and initiative manifested through research may conquer cancer, arthritis and other as yet unconquered scourges of humankind. Science, as history well demonstrates, prospers best when free and unshackled.

Program

The physicians represented by the American Medical Association propose the following constructive program for the extension of improved health and medical care to all the people:

1. Sustained production leading to better living conditions with improved housing, nutrition and sanitation which are fundamental to good health; we support progressive action toward achieving these objectives.

2. An extended program of disease prevention with the development or extension of organizations for public health service so that every part of our country will have such service, as rapidly as adequate personnel can be trained.

3. Increased hospitalization insurance on a voluntary basis.

4. The development in or extension to all localities of voluntary sickness insurance plans and provision for the extension of these plans to the needy under the principles already established by the American Medical Association.

5. The provision of hospitalization and medical care to the indigent by local authorities under voluntary hospital and sickness insurance plans.

6. A survey of each state by qualified individuals and agencies to establish the need for additional medical care.

7. Federal aid to states where definite need is demonstrated, to be administered by the proper local agencies of the states involved with the help and advice of the medical profession.

8. Extension of information on these plans to all the people with recognition that such voluntary programs need not involve increased taxation.

9. A continuous survey of all voluntary plans for hospitalization and illness to determine their adequacy in meeting needs and maintaining continuous improvement in quality of medical service.

10. Discharge of physicians from the armed services as rapidly as is consistent with the war effort in order to facilitate redistribution and relocation of physicians in areas needing physicians.

11. Increased availability of medical education to young men and women to provide a greater number of physicians for rural areas.

12. Postponement of consideration of revolutionary changes while 60,000 medical men are in the service voluntarily and while 12,000,000 men and women are in uniform to preserve the American democratic system of government.

13. Adoption of federal legislation to provide for adjustments in draft regulation which will permit students to prepare for and continue the study of medicine.

14. Study of postwar medical personnel requirements with special reference to the needs of the veterans' hospitals, the regular army, navy and United States Public Health Service.

MEDICINE AND THE WAR

THE SUPPLY OF MEDICAL STUDENTS AND PHYSICIANS

Memorandum presented on June 4, 1945 to President Harry S. Truman by a special committee of the Committee on Postwar Medical Service consisting of Evarts Graham, M.D., St. Louis; Victor Johnson, M.D., Chicago; Harvey Stone, M.D., Baltimore, and Fred C. Zapffe, M.D., Chicago.

Whatever measures may be taken in the near future for the improvement of the health of this nation, including the construction of additional hospital facilities and the extension of various plans of prepayment insurance against sickness, it would seem to be axiomatic that physicians must be provided in adequate numbers if these measures are to succeed. Yet we are now failing to provide for the training of enough physicians to meet the demands for doctors which we know will increase after the war.

At that time we shall need about 30,000 more physicians than before the war, primarily because of the requirements of the Veterans Administration (about 15,000) but also because of the needs of the peacetime Navy (about 5,000) and the Army plus possibly a compulsory universal military training program (about 10,000). This estimate disregards extra physicians required to provide replacements for casualties among medical officers, medical assistance to liberated countries and the more complete and extensive medical care demanded in this country.

Even if admissions, enrolments and graduations from our medical schools should continue at the present wartime levels, only about half of this need would be met, since 40,000 students will receive the M.D. degree in the period 1942 to 1948 and 24,000 physicians will have died during that time. Thus, under the most favorable conditions only about 16,000 additional physicians will be available after the war to do the work of 30,000.

In spite of this, freshmen enrolments in the medical schools of this country will be drastically reduced within the next year. In the past year virtually no able bodied males have been permitted to commence the two year course of college premedical studies because the Army and Navy have ceased assigning men to such studies and the Selective Service System has discontinued deferments of premedical students. In the past few years each freshman class of about 6,000 students included 4,000 to 5,000 able bodied men. These are no longer available under existing regulations.

From now until some time after the war, medical schools must enroll their freshmen from the following limited groups: women, physically disqualified males, men under or over the draft age and veterans. Relatively small numbers are available in these categories: medical schools annually receive applications from only 800 to 900 women and even fewer physically disqualified males; men under 18 or over the draft age can be disregarded, since there is only a handful of such students enrolled in medical studies. These three categories would scarcely supply 1,200 to 1,500 entering freshmen for the medical school classes of early 1946, even if all who applied to medical schools were admitted, with complete disregard for the qualifications of the applicants for the study and practice of medicine.

Major Gen. Lewis B. Hershey, the director of the Selective Service System, has stated that several hundred, or even a few thousand, acceptable medical applicants should surely be forthcoming from the hundreds of thousands of veterans being discharged from the armed forces. Checking on this statement indicates that it is a belief without foundation in fact. Eight large universities (California, Chicago, Illinois, Iowa, Michigan, Minnesota, Northwestern and Wisconsin), which normally supply 800 to 900 of the entering freshmen in our medical schools, now have enrolled just 42 veterans in premedical studies who will complete their preparation for entrance into medical school before 1947. Only 28 of these were considered probably acceptable as medical students and physicians. Generalizing from these data, it would seem that veterans may be expected to provide less than 4 per cent of the freshman class before 1947, totaling perhaps 200 to 300 students as compared with the total of 6,000 normally admitted.

Within the next year medical school freshmen admissions will be reduced by about 5,000 because of the existing policies and there will be an equal reduction in M.D. graduates three years hence. To write off 5,000 physicians is equivalent to depriving medical care from 100,000 hospitalized veterans, 1,000,000 soldiers or sailors or 4,000,000 civilians. Passage of even the best of the scores of medical care and hospitalization bills now pending in Congress and state legislatures would be ineffective and meaningless if we simultaneously prohibit the training of sufficient doctors.

This deficiency can be corrected under the present Selective Service Act as follows: Defer qualified men now in college premedical studies when they reach 18 and defer 8,000 selected high school graduates of this year to commence college studies in premedicine. From these, 4,500 should be earmarked for admission to specific medical schools a year later. Repetition of this procedure each year the war lasts would effect the training of enough doctors to care for the health of the people. Consideration might also be given to the assignment of a limited number of men now under arms back to premedical studies, provided they pursue such studies satisfactorily before induction, as far as this may be consistent with military necessity.

It is of basic importance to note that the restrictive regulations now in effect were promulgated a year ago. Since that time the war situation has radically changed. Even though we still have a tremendous task ahead, requiring the mobilization of all necessary resources, it remains true that the Selective Service System has recently announced a reduction in the rate of induction of men into the armed forces by 30,000 per month starting in July. It is not apparent that the deferment of a small percentage of this number of premedical students would in any way affect the military situation. On the other hand, it would help to insure adequate medical care of civilians, including veterans, after the war.

The acute need for an appropriate adjustment is underscored by the realization that the present policies will result in the same drastic reduction in medical school enrolments for each year that the Asiatic war lasts. It will even continue for a period after the peace, since premedical studies require two years before a student is ready to enter a medical school. The necessity for a continuous flow of students into and through our medical schools has been urged by the Surgeons General of the three armed services, by Mr. Paul McNutt of the War Manpower Commission, by Dr. Frank Lahey, chairman of the Directing Board of the Procurement and Assignment Service for Physicians, by every medical school in the country with a single exception and by virtually all medical educators and leaders in the medical profession. This conviction does not represent a special interest or problem of the medical profession or the medical schools. Actually, most medical schools would welcome an enforced period of relaxation from their arduous wartime program involving increased enrolments and acceleration of the training. The proposed adjustments are dictated only by the necessity for preserving the health of the nation.

ARMY

MEDICAL EQUIPMENT FOR SHIPMENT TO PACIFIC

Medical equipment being shipped to the Pacific is prepared at U. S. Army Medical Depot M-424, Honeybourne, England, the largest depot of its kind in England. Everything from delicate surgical instruments to x-ray machines is processed at this depot. Some 2,500 items are included in a so-called medical unit, which is sent as freight and does not accompany the hospital personnel. Certain surgical instruments require considerable time to prepare for shipment. A forceps, for example, gets a brisk cleaning in water, is dipped into carbon tetrachloride solution and is dried again. Then a technician, wearing rubber gloves, dips it again into a menthol solution to remove finger prints. After the forceps is dried it is covered with an oil preservative, then wrapped in an aluminum foil and finally hermetically sealed in cellophane. Thousands of individual surgical instruments require this treatment.

Major Charles A. Bohan, who is in charge of receiving and checking equipment at this depot, stated that bulky machines are torn down to save shipping space. If an item is damaged or rusted it is thrown into the salvage pile or "cannibalized" for good parts. Pacific bound hospitals will use only American equipment. British items turned in at the depot are declared surplus, with future disposition to be made by the Army's general purchasing agent.

57th STATION HOSPITAL

The 57th Station Hospital, located in Tunis, was recently awarded the Meritorious Service Unit Plaque for superior performance of duty during the period Jan. 1, 1944 to Nov. 1, 1944. The presentation of the plaque was the highlight of the army day celebration in Tunis, at which the American, English and French armies were well represented as well as members of the guard of the Bey of Tunisia.

The following medical corps officers are assigned to the 57th Station Hospital: Major Paul M. Fuller, commanding officer, Kalamazoo, Mich.; Capt. Alex E. Fairshter, ward officer, Philadelphia; Capt. George A. Greenberg, in charge of medical service, Somerville, N. J.; Capt. Joseph B. Johnston Jr., ward officer, Barium Springs, N. C.; Capt. Emory L. Mauritz, in charge of surgical service, Des Moines, Iowa, and Capt. Julius L. Samuels, eye, ear, nose and throat officer, Hollywood, Calif.

U. S. ARMY MEDICAL CORPS CONVALESCENT CAMP IN CHINA

A complete remedial therapy gymnasium has been constructed at the U. S. Army Medical Corps convalescent camp near Kunming, China, to hasten the recovery of American troops in the China theater following hospitalization for battle injuries, major operations, fractures and other casualties. Capt. Julius R. Pearson, Miami Beach, Fla., is the medical officer in charge. All the equipment at the camp has been built from salvaged materials. Parts of wrecked airplanes and jeeps, scrap metal and lumber, old steering wheels from trucks, tin cans, pipe and concrete are used in the construction of machines.

MERITORIOUS SERVICE UNIT PLAQUE

The Meritorious Service Unit Plaque was recently awarded to the 1798th Service Command Unit, Station Complement, Headquarters Detachment, Veterinary Section, Fort Des Moines, Iowa, for superior performance of duty in connection with food inspection activities throughout the state of Iowa during the last four years.

MEDICAL NUTRITION LABORATORY

The formal opening and dedication of the Army Service Forces Medical Nutrition Laboratory, Surgeon General's Office, U. S. Army, took place June 9 at the Chicago Quartermaster Depot. Major George H. Berryman, commanding officer of the Medical Nutrition Laboratory, presided.

DR. WILLARD O. THOMPSON AWARDED CERTIFICATE OF DISTINGUISHED SERVICE

Dr. Willard O. Thompson, chairman of Regional Committee No. 14 of the Committee for Wartime Graduate Medical Meetings, was recently awarded a Certificate of Distinguished Service by Major Gen. Russell B. Reynolds, commanding general, Sixth Service Command. According to the citation accompanying the award, "In 1942 the American Medical Association, in conjunction with the American College of Surgeons and the American College of Physicians, established a fund to provide postgraduate medical instruction for medical officers stationed throughout the Army. Dr. Willard O. Thompson, chairman of the Committee for Wartime Graduate Medical Meetings for Region No. 14, which includes Illinois and Wisconsin, obtained the services of prominent teachers and practitioners of medicine to lecture and conduct clinical exercises in the hospitals of the Sixth Service Command. He himself has actively participated in the teaching and by boundless energy and enthusiasm has maintained the continuity and high quality of the program. The medical officers of this service command as well as hundreds of civilian physicians who have attended the courses at army hospitals have universally expressed their appreciation for this unusual opportunity for postgraduate instruction, which has definitely raised the standard of medical practice in the Sixth Service Command. Dr. Thompson, as chairman of the committee, by his untiring efforts and devotion to this important program, has rendered distinguished service to the Sixth Service Command, and in recognition thereof the commanding general is pleased to present this citation."

BLINDED VETERANS ORGANIZE ASSOCIATION

One hundred soldiers who have lost their sight in the war recently organized a Blinded Veterans Association, the first of its kind in this country, to help blinded service men establish themselves as independent members of their home communities. The association will act as a clearing house for jobs for blinded veterans of this and World War I. The constitution of the Blinded Veterans Association forbids the acceptance of contributions and will be maintained only from fees and dues of members. The organization was set up at the Army's Old Farms Convalescent Hospital, Farmington, Conn. Mr. Raymond Frey, a former army lieutenant, who is now an instructor of the blind at Valley Forge General Hospital, Phoenixville, Pa., is chairman of the association.

MERITORIOUS SERVICE UNIT PLAQUE

Military personnel assigned to Dibble General Hospital, Menlo Park, Calif., Service Command Unit 1985, have been cited for "superior performance of duty" between Dec. 1, 1944 and Jan. 31, 1945 and authorized to wear the Meritorious Service unit insigne. Presentation of a Meritorious Service unit plaque to the Menlo Park army installation also was authorized by Major Gen. William E. Shedd, commanding general of the Ninth Service Command.

NEW DERMATOSES SLIDES TO AID INSTRUCTION

The Office of the Surgeon General reported recently that six sets of lantern slides on cutaneous disease have been completed by the Army Medical Museum and are ready for distribution. They will be lent to army teaching centers and are available for deployment teaching programs. These slides emphasize dermatoses which have been seen in tropical overseas theaters. All but three are in color.

COLONEL BLADES NAMED CONSULTANT

Lieut. Col. Brian B. Blades, M. C., who is chief of the thoracic surgical section of Walter Reed General Hospital, Washington, D. C., has been appointed consultant to the Surgeon General in thoracic surgery, in addition to his other duties.

ARMY AWARDS AND COMMENDATIONS

Lieutenant Colonel Robert D. Bickel

Lieut. Col. Robert D. Bickel, formerly of Gallup, N. M., and now assigned to the Liaison Office at the American Medical Association, was recently presented with the Legion of Merit award "for exceptionally meritorious service in the performance of duty as commanding officer, —— Station Hospital during the period Jan. 1, 1943 to Oct. 13, 1944. Lieutenant Colonel Bickel (then Major) despite inadequacies of personnel and difficulty of supply while in India, has enlarged and expanded this hospital of a 50 bed capacity to meet rapidly increasing needs. He moved it from India to China, where the supply problem was even more acute, and continued its expansion. Because of his untiring efforts, efficient administration, devotion to duty and outstanding leadership, this hospital was able to perform its mission and also to meet extraordinary demands caused by the sudden unanticipated evacuation of patients from the hospital in East China and the Air Force dispensaries. This service reflects great credit both to Lieutenant Colonel Bickel and to the armed forces of the United States." Dr. Bickel graduated from Johns Hopkins University School of Medicine, Baltimore, in 1937 and entered the service March 10, 1941.

Captain Albert H. Meinke Jr.

Capt. Albert H. Meinke Jr., formerly of Detroit, was recently cited "for meritorious service in combat during the period Feb. 20 to Feb. 26, 1945 in the Apennine Mountains, Italy. During an attack, when mounting casualties crowded his aid station, and the enemy subjected his position to a terrific artillery barrage, Captain Meinke performed his duties as battalion surgeon with cool courage and skill. Laboring for more than forty-eight hours without rest, he gave the best medical assistance to each of the wounded and directed the disposition and evacuation of all casualties with commendable efficiency and promptness. By his tireless devotion to duty under the most distressing conditions, Captain Meinke saved many lives and prevented much pain and suffering. He has well earned the commendation and praise of all for his inspirational accomplishments, which are truly in keeping with the finest traditions of the Medical Corps." Dr. Meinke graduated from the University of Michigan Medical School, Ann Arbor, in 1943 and entered the service Aug. 4, 1944.

Captain Harlan Alfred Alexander

A Bronze Oak Leaf Cluster was recently awarded to Capt. Harlan Alfred Alexander, formerly of Minneapolis, for "heroic achievement in connection with military operations against the enemy on Oct. 24, 1944 during the Leyte Island operation. During a time when an infantry battalion was attacking north on the Buri airstrip, the launching of a severe enemy counterattack inflicted many casualties among the friendly forces and prompted an immediate withdrawal of the battalion. Captain Alexander, realizing the necessity for evacuating the wounded, and with the knowledge that front line protection had been withdrawn, maintained his aid station in the exposed area until all the wounded were evacuated to a place of safety. This action, with utter disregard for his own personal safety, was an impressive demonstration of courage on the part of Captain Alexander." Dr. Alexander graduated from the University of Minnesota Medical School, Minneapolis, in 1930 and entered the service Sept. 8, 1942.

Colonel Jarrett M. Huddleston

An Oak Leaf Cluster to the Silver Star was awarded posthumously recently to Col. Jarrett M. Huddleston, formerly of Washington, D. C. The citation accompanying the award read "for gallantry in action at ——, Italy, on Feb. 7, 1944. At about 08:15 Feb. 7, 1944 an enemy dive bombing attack caused considerable damage to buidings and vehicles, one of the latter being loaded with ammunition. Colonel Huddleston, who at the time was engaged on a tour of inspection of hospitals, came upon the scene at the time of the attack. With complete disregard for his own life and safety, he entered one of the buildings, then burning, to rescue a badly wounded soldier who was buried in the wreckage. Working with coolness and efficiency he evacuated the soldier, commandeered a vehicle and dispatched him quickly to a hospital. During all this time exploding projectiles and bursting shrapnel from a burning truck covered the area. Colonel Huddleston's calm and courageous action undoubtedly saved the life of the wounded soldier, prevented widespread confusion and was an inspiration to all present, reflecting the highest credit upon himself and is in keeping with the finest traditions of the Army of the United States." Dr. Huddleston graduated from George Washington University School of Medicine, Washington, in 1916 and entered the service the following year.

Captain Leon M. Swift

The Bronze Star was recently awarded to Capt. Leon M. Swift, formerly of Marysville, Calif., "for meritorious service in connection with military operations against an armed enemy. During the period of Dec. 29, 1944 to Jan. 13, 1945 Captain Swift, as platoon leader of the clearing platoon, worked tirelessly and very efficiently in treatment of battle casualties which passed through his station in great numbers. Although in poor health at the time, Captain Swift refused to be evacuated and worked for excessively long periods of time without regard for his health and personal comfort, and his timely and superior treatment of the great number of battle casualties resulted in the saving of many lives. His leadership and devotion to duty was an inspiration for the excellent functioning and operation of the clearing platoon. Captain Swift's outstanding professional ability, devotion to duty and disregard for personal welfare are in keeping with the highest tradition of the United States Army." Dr. Swift graduated from the College of Medical Evangelists, Los Angeles, in 1933 and entered the service May 2, 1942.

Captain Robert H. Draddy

The Bronze Star was recently awarded to Capt. Robert H. Draddy, formerly of New York, for "meritorious achievement in action" from Nov. 11, 1944 to April 23, 1945 in France and Germany. "As commanding officer of a collecting company," said the citation, "Captain Draddy discharged his duties in an exemplary manner throughout the period in which the division fought its way through the mountainous terrain of the Vosges into Germany and across the Rhine. During the bitterly contested crossing of the Neckar River at Heilbronn, Germany, he so well organized and directed the evacuation of casualties that despite long litter hauls and enemy action many wounded men arrived at the clearing station in less than two hours after their recovery. Captain Draddy's excellent utilization of personnel and equipment thus resulted in the saving of many lives in this and countless other actions." Dr. Draddy graduated from Cornell University Medical College, New York, in 1943 and entered the service Dec. 31, 1942.

Captain Hime Poliner

Capt. Hime Poliner, formerly of Easton, Pa., was recently cited for performing an appendectomy under difficult conditions on an LCI (L). According to the citation signed by Lieut. George Linton Jr., U.S.N.R., commanding the ship, the patient complained of sharp abdominal pains while the ship was off Mindoro Island, Philippine Islands, on April 11 last. "Capt. Hime Poliner, M. C., . . . being the only physician on board the ship, examined the patient and diagnosed the complaint as acute gangrenous appendicitis, necessitating an immediate appendectomy." The concluding paragraph of the citation read "It is the desire of this command to commend Dr. Poliner to his superior officers for the prompt and skilful action taken by him under these somewhat unique circumstances, as the appendectomy performed by Dr. Poliner is, to the best knowledge of this command, the first operation of its kind performed aboard an LCI (L)." Dr. Poliner graduated from Temple University School of Medicine, Philadelphia, in 1936 and entered the service in December 1942.

Major George M. Brother

George M. Brother, formerly of Indianapolis, was recently awarded the Bronze Star for developing an extremely effective malaria control program. He has been assistant surgeon at headquarters of the 15th AAF for some time. Dr. Brother graduated from the Indiana University School of Medicine, Indianapolis, in 1934 and entered the service Dec. 8, 1942.

NAVY

NAVY AWARDS AND COMMENDATIONS

Captain Howard K. Gray

The Navy Commendation Ribbon was recently awarded to Capt. Howard K. Gray, formerly of Rochester, Minn. Captain Gray, who was chief of the surgical service at the Navy Hospital, Aiea Heights, Hawaii, between August 1944 and May 1945, was commended for "devotion to duty, able leadership in coordinating the surgical service of the hospital and superior skill in his profession." He is now serving as chief of surgery at the U. S. Naval Hospital at San Diego. Dr. Gray graduated from Harvard Medical School, Boston, in 1927 and entered the service Dec. 26, 1941.

Lieutenant Commander Ralph C. Parker Jr.

Lieut. Comdr. Ralph C. Parker Jr., formerly of Boston, was recently awarded the Bronze Star "for meritorious service as senior medical officer attached to the U. S. S. *Arkansas* prior to and during the invasion of the coast of France on June 6, 1944. Skilled and tireless in the performance of duty, Lieutenant Commander Parker achieved exceptional success in training the personnel of the medical department for the prompt and expert care and treatment of casualties brought aboard during assault operations. His outstanding professional integrity and devoted efforts were responsible for the saving of many lives and in keeping with the highest traditions of the United States Naval service." Dr. Parker graduated from Harvard Medical School, Boston, in 1937 and entered the service July 2, 1938.

Lieutenant Joseph Rogers

Lieut. Joseph Rogers, formerly of Brooklyn, was recently commended, the citation reading "For distinguishing himself by heroism after his ship had suffered a damaging underwater explosion during the occupation of Kiska Island on Aug. 18, 1943. He worked heroically for a period of thirty-six hours administering expert medical treatment to men injured in the explosion. Medical treatment to these men was so ably administered that all injured men recovered. His conduct was at all times in keeping with the highest traditions of the naval service." Dr. Rogers graduated from Harvard Medical School, Boston, in 1941 and entered the service Oct. 5, 1942.

MISCELLANEOUS

CONTROL OF TYPHUS IN YUGOSLAVIA

The United Nations Relief and Rehabilitation Administration recently assumed leadership in the program for the control of typhus in Yugoslavia as part of its duties under the International Sanitary Conventions of 1944.

The United States of America Typhus Commission formerly led the control program in Yugoslavia, with UNRRA personnel assisting. The commission signed an agreement with Marshal Tito in January 1945 setting up the necessary arrangements for the work. Mass inoculation of the entire population of Bosnia and Herzegovina is well under way, and half a million people have been inoculated to halt the spread of endemic typhus in that area. DDT powder and vaccine were shipped to the area by plane so as to expedite the program. Twenty UNRRA doctors, nurses, sanitary engineers and other technicians are now at work as members of the health staff of the UNRRA Yugoslav mission. The takeover of the control program by UNRRA was completed July 1.

The first typhus epidemic of World War II in Yugoslavia was reported from the Partisan side in the winter of 1941-1942. The disease reached a peak in the section then known as "Independent Croatia" the following winter, when there were over 30,000 cases with more than 5,000 deaths among the civilian population in western Bosnia and Dalmatia. In central and eastern Bosnia typhus reached epidemic proportions in 1944.

Typhus broke out in 1941 in a large concentration camp in Serbia, where a number of gipsies were interned. It gradually spread over the country and in the winter of 1943-1944 there was a severe epidemic. With the arrival of the United States of America Typhus Commission last winter, modern methods of epidemic control were introduced. DDT insecticide powder is applied with hand or electric blow guns. Hundreds of people can be disinfested in a short time. No undressing, bathing and subsequent disinfection of wearing apparel is necessary.

Dr. W. A. Sawyer, director of the health division, expressed a hope that UNRRA, in carrying forward the work so well begun by the United States of America Typhus Commission, in cooperation with the health officers of the Yugoslav government, would be able to rid Yugoslavia of louse borne typhus and so preclude the possibility of future outbreaks.

CUBAN DOCTORS VOLUNTEER FOR WORK IN OCCUPIED EUROPE

Four Cuban doctors who have volunteered for duty in occupied Europe recently arrived in the United States for special studies at the University of Maryland before going to Europe for the United Nations Relief and Rehabilitation Administration. They are Drs. Amary Escalona, Oscar Ferrer, Rene Vallejo and Enrique Roig.

HOSPITALS NEEDING INTERNS AND RESIDENTS

The following hospitals have indicated to the Council on Medical Education and Hospitals that they have not completed their house staff quota allotted by the Procurement and Assignment Service:

(Continuation of list in THE JOURNAL June 30, p. 671)

CALIFORNIA

St. Luke's Hospital, San Francisco. Capacity, 225; admissions, 6,156. Dr. Howard H. Johnson, Medical Director (assistant resident—mixed service, disqualified for medical service).

DISTRICT OF COLUMBIA

St. Elizabeths Hospital, Washington. Capacity, 7,576 beds; admissions, 2,599. Dr. Winfred Overholser, Medical Director (intern).

ILLINOIS

Illinois Masonic Hospital, Chicago. Capacity, 186; admissions, 5,322. Mr. William H. Tenney, Superintendent (2 interns, October 1).

Oak Park Hospital, Oak Park. Capacity, 182; admissions, 5,479. Sister St. Colette, Superintendent (intern).

MASSACHUSETTS

Massachusetts General Hospital, Boston. Capacity, 480; admissions, 7,677. Dr. N. W. Faxon, Medical Director (interns and residents—anesthesia).

NEW JERSEY

Hackensack Hospital, Hackensack. Capacity, 300; admissions, 7,293. Mrs. Mary Stone Conklin, R.N., Superintendent (3 interns).

Passaic General Hospital, Passaic. Capacity, 275; admissions, 5,399. Miss Margaret A. Wallace, R.N., Superintendent (intern).

NEW YORK

St. Joseph Hospital, Far Rockaway. Capacity, 163; admissions, 2,671. Sister M. Bertrand, Superintendent (resident—mixed service).

Gouverneur Hospital, New York City. Capacity, 220; admissions, 3,221. Dr. O. I. Bloom, Medical Superintendent (intern).

New York State Reconstruction Home, West Haverstraw. Capacity, 310; admissions, 142. Dr. Kenneth S. Landauer, Acting Superintendent (residents—orthopedic surgery).

OHIO

Glenville Hospital, Glenville. Capacity, 135; admissions, 3,411. Mr. A. B. Harris, Superintendent (resident—mixed service).

PENNSYLVANIA

Northeastern Hospital, Philadelphia. Capacity, 102; admissions, 2,455. Mr. Charles H. Dabbs, Administrator (2 interns).

SOUTH CAROLINA

Greenville General Hospital, Greenville. Capacity, 355; admissions, 8,515. Mr. J. B. Norman, Superintendent (interns).

UTAH

Thomas D. Dee Memorial Hospital, Ogden. Capacity, 400; admissions, 8,405. Mr. Lawrence H. Evans, Superintendent (interns).

ORGANIZATION SECTION

Washington Letter

(From a Special Correspondent)

July 14, 1945.

Downey Charges Army Is "Hoarding" Doctors

Senator Sheridan Downey of California has charged that surplus army doctors in Europe are not working "more than an hour or two a day" and should be returned at once to this country to relieve the shortage of civilian doctors. As chairman of a special military affairs subcommittee investigating army use of doctors, he says that 7,000 doctors the Army promised to release by next May 1 should be returned to civilian service immediately. Mr. Downey said that since the investigation was reported in the army newspaper *Stars and Stripes* he has "had letters from doctors who are not working more than two hours a day—majors, colonels, captains." He said their morale "is breaking down" and letters from the Pacific reveal a similar situation there. Brig. Gen. Robert Berry informed the hearing that the War Department wants to return these doctors "as soon as it can," but that the commanding general of the European theater had advised the department on July 5 that "he flatly can't see any possibility of giving up these men immediately." The Army's "leisurely attitude" toward releasing surplus doctors was condemned by Senator Johnson of Colorado, and Senator Gurney of South Dakota suggested that something might be done to bring them home ahead of troops to be discharged. He reported complaints from 60 year old doctors who have "worked their hearts out" and want to be relieved.

Fewer Infantile Paralysis Cases Expected in 1945

Although the U. S. Public Health Service has warned of a seasonal rise in infantile paralysis, it also reports evidence that the number of infantile paralysis cases this year may be much fewer than the 19,053 recorded during 1944, which was the second highest number on record; 27,363 cases occurred in 1916. Through July 7 this year 1,424 cases had been reported from all parts of the country, as compared with 1,290 for the period last year. The excess for 1945 was explained by an unusually high incidence early in the year. Encouragement was reported from the fact that for the third consecutive week new cases have been fewer than for the corresponding week of 1944. Texas has been hardest hit so far this year; it reports a drop in new cases from 54 for the week ended June 30 to 21 for the week ended July 7. The worst epidemics last year were in North Carolina, Virginia, Kentucky and Erie County, N. Y. Health authorities believe that the high incidence in New York early this year was due to cases which started in 1944 but were not reported until this year. Health officials said that normally regions where the disease is widespread one season do not suffer visitations the next. Infantile paralysis is a warm weather scourge of countries in the temperate zone, with the United States probably the greatest sufferer. The malady usually tapers off with the arrival of cool fall weather.

Hospitals Included in Five Billion Dollar Postwar Construction

Erection of new hospitals and extensions to existing facilities are included in plans for a 5 billion dollar reserve of state and local construction projects now being assembled by a House postwar economic planning committee to stabilize the building industry after the war. This construction reserve, according to the committee, should be in addition to those plans for which local financing is available. Representative Colmer of Mississippi laid down three principles "as a foundation on which to erect a healthy national construction program: 1. The federal government should hold out no promise of aid to states or municipalities during the first peace years for financing their public works—especially since many of these are in a stronger financial position than before the war. 2. The federal government should assume leadership in building up an adequate reserve shelf of engineering plans . . . to lay the foundation for an orderly long term public works program and to provide a cushion against future drastic decline in the construction industry. 3. A construction policy board would be established in the executive office of the President to guide the public works program and to serve the construction industry in its efforts to maintain a healthy, stable growth in relation to national income.

Office Space Lacking in Capital for Returning Doctors

A serious shortage of office space in Washington, which is believed to exist in many other communities, is under study by the District of Columbia Medical Society. Col. A. Clagett Gray, medical officer of District Selective Service, is chairman of the Medical Society Committee on Service Physicians, which is endeavoring to obtain special preference for office space for service doctors returning to civilian practice. Some doctors who have already returned have been unable to find offices according to secretary Theodore Wiprud, who revealed that a survey of medical buildings and office space in other buildings revealed little hope of relieving the situation soon. He explains that Washington is now being served with a "minimum" number of doctors for its population and that the city needs the additional medical care which could be given by returning physicians and surgeons.

How Whole Blood is Shipped to the Pacific by Air

Whole blood is shipped successfully across the Pacific by air in an insulated container in which the bottled blood is placed in racks around a large compartment of cracked ice, according to Charles F. Belshaw, research consultant of the National Association of Ice Industries. He explained that although temperatures inside planes in the Pacific often go as high as 130 F., this method keeps the blood to be used in treating the wounded at a temperature between 40 and 45 F., which is necessary to keep it in usable condition. He also revealed that vegetable produce shipped bedded down in finely granulated ice keeps its freshness, crispness and vitamin C content over a longer period. This was learned from research conducted in twenty-one colleges. "This method of refrigerating produce with snow-ice is like the protective effect of the late spring snows on vegetation," Mr. Belshaw said. The research further showed that vitamin C retention in foods is essential in maintaining flavor and that keeping vegetables fresh through the use of snow-ice will bring food to the dinner table so that it tastes better and is better nutritionally.

Cleric Criticizes District Sterilization Bill

Rev. Patrick J. O'Connor, professor of sacred eloquence at Catholic University, has criticized what he terms efforts to "railroad" legislation to permit the sterilization of the feeble-minded. He spoke at the laying of a cornerstone of the new $240,000 graduate nurses' building and called attention to the House bill with the question "Is this the price of victory?" His remarks recalled the storm three months ago when the District of Columbia commissioners were under fire for allowing the sterilization of 3 patients at Gallinger Hospital. Subsequently Corporation Counsel Keech decided that there was no legal authorization even if a waiver by the patient or parents had been obtained.

Capital Notes

The gravest possible manpower shortage in local hospital history may close the tuberculosis ward in Gallinger Hospital, according to a report by Health Officer George C. Ruhland.

More than 8,000 of the 12,000 commitments to the District of Columbia jail in the past year were from alcoholism, and a sharp increase after the war is expected, reports Howard B. Gill, superintendent of penal institutions.

Gen. Jacob L. Devers, former commander of the 6th Army group in Europe and newly appointed chief of Army Ground Forces, recently visited wounded officers and men who had served under him, now hospitalized at Walter Reed Hospital.

Bureau of Information

SUMMARY SHEETS FROM ALABAMA, NEW YORK AND NORTH DAKOTA

Completed county summary sheets have been received from the Medical Association of the State of Alabama through Dr. D. L. Cannon, secretary; from the Medical Society of the State of New York through Dr. Walter P. Anderton, and from the North Dakota State Medical Association through Dr. L. W. Larson, secretary.

Alabama

County [1]	Principal Cities [2]	Population	Physicians Under 65	Persons per Physician	Persons per Telephone [3]
Chambers		37,777	10	3,778	225
	Lanett	6,141			
Cherokee		15,891	3	5,297	91
Colbert		35,493	12	2,958	27
	Sheffield	7,933			
	Tuscumbia	5,515			
Coosa		11,149	2	5,575	136
Escambia		28,285	3	9,422	50
	Brewton	3,323			
	Atmore	3,200			
Limestone		31,679	10	3,168	62
	Athens	4,342			
Monroe		23,355	7	3,336	85
Perry		20,722	4	5,180	53
Pike		27,775	8	3,472	31
	Troy	7,055			
Washington		13,347	2	6,674	152

New York

Allegany		33,534	24	1,522	8
	Wellsville	5,942			
Livingston		33,476	29	1,154	8
	Mount Morris	3,530			
	Dansville	4,976			
Montgomery		53,415	58	921	8
	Amsterdam	33,329			
	Canajoharie	2,577			
	Fort Plain	2,770			
Niagara		165,981	86	1,930	11
	Niagara Falls	78,029			
	Lockport	24,379			
	N. Tonawanda	20,254			
Ontario		49,874	59	845	8
	Canandaigua	8,321			
	Geneva	15,555			
Orleans		25,224	19	1,328	10
	Medina	5,871			
	Albion	4,660			
Oswego		63,559	46	1,382	9
	Oswego	22,062			
	Fulton	13,362			
Otsego		41,157	31	1,328	6
	Oneonta	17,731			
	Cooperstown	2,599			
Putnam		14,557	10	1,456	6
Wyoming		29,067	20	1,453	9
	Perry	4,468			
	Warsaw	3,554			

North Dakota

Burke		6,442	1	6,442	13
Burleigh		19,299	22	877	7
	Bismarck	15,496			
Cavalier		11,830	4	2,958	17
Golden Valley		2,995	1	2,995	11
Grant		6,365	3	2,122	33
Kidder		5,599	1	5,599	30
McHenry		12,080	3	4,027	12
McKenzie		6,456	1	6,456	35
Mercer		8,019	2	4,009	23
Steele		4,247	2	2,124	17

1. Bureau of Census, estimated population 1943.
2. Bureau of Census, population 1940.
3. Based on 1940 figures, American Telephone and Telegraph Company.

The accompanying table gives data from counties in each of these states. The column giving the number of persons per telephone is used as one index of the economic status of the area. Many physicians over 65 years of age are carrying on large practices and are doing much to maintain the health of communities. They are not included in computing physician population ratio, however, as the future needs of the communities will be largely dependent on younger physicians.

A current knowledge of needs of communities for doctors is essential if adequate help is to be given veteran medical officers in their problems of medical practice. These needs can be indicated on the summary sheets under "Remarks" by the state and county secretaries and are then available to inquiring medical officers. Frequent reports from state and county medical societies about needs of communities for doctors will help maintain current files and will increase the service of the Bureau.

With the information available on a completely filled out summary sheet, it is readily possible for an interested medical officer to make an initial selection of areas in which he might like to practice. Since vacancies are held open in many communities for doctors now in military service, further investigation by direct correspondence with state and county medical societies will always be necessary to insure an accurate report of the needs of individual communities.

Council on Medical Service and Public Relations

MEETING OF JUNE 21-22, 1945

The meeting of the Council on Medical Service and Public Relations was called to order by the vice chairman, Edward J. McCormick, Toledo, Ohio, in the Council offices, American Medical Association, Chicago. Present were Drs. McVay, McGoldrick, Adson, Lawrence, Bauer, West and Mr. Hendricks.

Election of Chairman and Changes in Council Personnel.—A letter of resignation as chairman was received from Dr. John H. Fitzgibbon, Portland, Ore. A motion was made by Dr. McVay, seconded by Dr. McGoldrick and carried, that a letter be sent to Dr. Fitzgibbon expressing appreciation of his services and untiring effort for the success of the Council. Dr. Fitzgibbon is to continue as a member of the Council.

A motion was made by Dr. McVay, seconded by Dr. Adson and carried, that Dr. McCormick be elected chairman of the Council.

A motion was made by Dr. McGoldrick and carried that Dr. McVay be vice chairman and a member of the executive committee of the Council. The executive committee of the Council is now composed of Drs. McCormick, McVay, Adson and Bauer.

During the meeting word was received that the Board of Trustees had elected Dr. William R. Brooksher, Fort Smith, Ark., a member of the Council to succeed Dr. Leathers, whose resignation had been accepted at the May 10-11 meeting of the Council, until the next session of the House of Delegates.

Meeting with the Board of Trustees.—Members of the Council met with the Board of Trustees.

The Board of Trustees addressed a communication to the Council concerning relationships of the Board of Trustees, the Council on Medical Service and Public Relations and the work of the Association.

Statements from Council to Board of Trustees.—The following day the Council again met with the Board of Trustees and presented a constructive program for medical care (see page 883 of this issue of THE JOURNAL), the Council suggestions relative to medical aspects of the Wagner-Murray-Dingell bill and the program of the Washington office.

The Board of Trustees approved the publication and distribution of the "Constructive Program for Medical Care" after being properly edited. The Board approved the Council suggestions relative to the medical aspects of the Wagner-Murray-Dingell bill. The Board approved the Washington office program, after discussion.

Informing County Societies of Council Action.—A motion was made by Dr. McGoldrick, seconded by Dr. McVay, and carried, that the Council's point of view in regard to pending legislation be forwarded to the chairmen of the legislative committees of the state societies. A motion also was made and carried that

the chairmen of the state legislative committees or their representatives be invited to attend a meeting in Chicago to discuss and plan for the better and wider dissemination of medical care for the people of this country.

Statement on Wagner-Murray-Dingell Bill.—A motion was made by Dr. McVay, seconded by Dr. McGoldrick, that the director of the Bureau of Legal Medicine and Legislation and the secretary prepare a statement on the Wagner-Murray-Dingell bill. Such a statement was prepared by the Council in 1943.

Speakers' Kits.—The Council is to stimulate the preparation of speakers' kits containing material which might be used by speakers before medical societies or lay groups in regard to the present Wagner-Murray-Dingell bill. These folders of material were collected and made available to speakers in 1943-1944 in Michigan and in Indiana. The Council is to obtain copies of these kits and suggests that similar kits be prepared for the 1945 bill by the various state legislative and public relations committees.

Service Plan Survey.—The preliminary chart that has been prepared on the service plans which are conducted under the approval of county and state medical societies was approved by the Council. This is to be checked with the various state and county plan managers and published in THE JOURNAL.

Journal Column with Regard to Medical Care and Hospital Insurance News.—Attention of the Council was called to the news column that appears under the Council on Medical Service and Public Relations heading in THE JOURNAL about hospital and sickness insurance. In addition articles are appearing under the heading of Medical Economics prepared by the Council summarizing reviews that are appearing in the *British Medical Journal* concerning the medical care programs of foreign countries. Suggestions were made that included in these should be summaries of the New Zealand and Australian medical care programs as they are appearing in the *British Medical Journal* and the *Lancet*.

Annual Report of Council.—A draft of the report prepared by Dr. Louis Bauer was distributed to members of the Council. It is to be reviewed by them and suggestions, corrections and additions sent to the Council office in order that a final draft of the report may be prepared. A suggestion was made by Dr. McCormick that the number of state and county societies addressed by Council members should be carried in this report.

Insurance Plan Advertisements.—The Board of Trustees referred to the Council for attention the question whether or not THE JOURNAL should carry advertisements for insurance plans for patients and stated that until principles were better established such advertisements could not be carried in THE JOURNAL. The Council approved the following statement: "The Council does not feel it can pass intelligently on the advisability of insurance advertising until an insurance bureau in the American Medical Association has been set up and proper standards for such plans have been determined. These standards cannot be determined without the help of this Bureau."

Medical Care in Rural Areas.—Dr. McVay discussed the problem of medical care in rural areas. He told how this problem is being approached in Missouri. The Council suggested that Dr. McVay write a statement of some five hundred words in regard to this question, which might be submitted for publication under the Council heading in THE JOURNAL.

Committee to Function with Farm Bureau.—Announcements were made that the Board of Trustees had appointed a committee to be headed by Dr. F. S. Crockett of Lafayette, Ind., to cooperate with the Farm Bureau in working out medical care program. Dr. McCormick was placed on that committee as a representative from the Council. The Council is to offer its full cooperation to Dr. Crockett and his committee.

Health Insurance: An Inquiry into Some of the Factors and Forces Underlying the Demand for a Compulsory System.—Dr. Fishbein called the attention of the Council to an article entitled "Health Insurance" by Carl W. Strow and Gerhard Hirschfeld. The article has been read by members of the Council, and the Council approved its publication "for the information that it contains relating to the factors underlying the demand for federal sickness insurance."

Additional Employment for Council Office.—The Council suggested several names to be considered for employment as an assistant to the secretary and as director of the Bureau of Medical Economics.

Public Relations Charts.—Charts showing the relation of the Council on Medical Service and Public Relations to other bureaus and councils in the American Medical Association and to the state and county medical societies were discussed before the Council by Mr. T. V. McDavitt of the Bureau of Legal Medicine and Legislation. These charts are to be completed for presentation at the next meeting of the Council.

Return of Physicians in Service.—The Council discussed the possibility of the return of those physicians in military service who can be spared now that the war in Europe is over. The Council believes that the return of these men as soon as national security will allow is one of the essential factors in the entire picture of the medical care program of the country. The return of these men is one of the points covered in the Constructive Program for Medical Care outlined by the Council.

American Cancer Society.—Dr. McGoldrick, chairman of this committee, stated that he and Dr. Bauer had arranged a meeting for the coming week with Louis Neff, Director of the American Cancer Society.

Public Relations by County and State Medical Societies.—In answer to requests as to what a county medical society can do in regard to public relations, Dr. Harold Camp, secretary, Illinois State Medical Society, and James Kelley, executive secretary, Milwaukee County Medical Society, wrote letters to outline the work a county medical society might do in public relations work.

Regional Conferences.—The secretary was instructed to make recommendations in regard to locations and schedules for regional conferences to be held this fall and winter and have these ready for presentation at the next meeting of the Council.

Lending Library.—A recommendation was made by Dr. McGoldrick that the Council establish a lending library system on subjects having to do with medical care, compulsory health insurance and subjects especially relating to the field covered by the Council.

Radio Programs.—Dr. W. W. Bauer, Director of the Bureau of Health Education, discussed the problem of radio with the Council. The Council discussed the idea of a nationwide hook-up proposed at the conference of seventeen presidents held recently in Detroit, at the invitation of the Michigan State Medical Society. Dr. Bauer discussed the preparation of "platters" (radio transcriptions) by the Council.

EDWARD J. MCCORMICK, M.D., Chairman.
THOMAS A. HENDRICKS, Secretary.

Medical Legislation

MEDICAL BILLS IN CONGRESS

G. I. Bill of Rights

The chairman of the House Committee on World War Veterans' Legislation, Representative Rankin, has introduced H. R. 3749, a bill to amend the Servicemen's Readjustment Act of 1944. In addition to liberalizing the loan provisions of the existing law, the pending bill would effect certain changes in the provisions relating to the education of veterans. It would provide that courses may be initiated four years after the date of the discharge of the veteran or the termination of the present war and that no course shall extend beyond nine years after the termination of the war; it would provide for short intensive postgraduate or vocational training courses of not less than thirty weeks; it would authorize correspondence courses of education or training and would increase the subsistence allowance of a veteran undergoing training or pursuing a course of education from $50 to $60 a month, if the veteran is without dependents, and from $75 to $85 a month if the veteran has dependents.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Institute for Negro Physicians.—The state department of health cooperated with the Jefferson County Health Department and the Slossfield Health Center in a five day institute for Negro physicians of the state at the health center in Birmingham, July 9-13.

Changes in Health Officers.—Dr. Charles J. Fisher, formerly health officer of Tuscaloosa County, has been named to a similar position in Lauderdale County.——Dr. Sydney E. Langer, U. S. Public Health Service, has been appointed health officer of Calhoun County to succeed the late Dr. Artice E. Culberson, Anniston. Dr. Culberson died while serving as acting health officer of the county following the resignation of Dr. Julius E. Dunn, Anniston, as health officer of Calhoun and Etowah counties to enter private practice in Wetumpka. Dr. Elmus K. Hanby, Attalla, is acting health officer in Etowah County.

CONNECTICUT

Herbert Miller Goes to Kansas.—Dr. Herbert C. Miller Jr. has resigned as assistant professor of pediatrics, Yale University School of Medicine, New Haven, effective July 1, to become professor and head of the department of pediatrics at the University of Kansas School of Medicine, Kansas City. Dr. Miller graduated at Yale in 1934 and became a member of the faculty the following year.

DISTRICT OF COLUMBIA

Personal.—Dr. Alvin R. Sweeney, U. S. Public Health Service, has been appointed superintendent of the Gallinger Municipal Hospital.

District Election.—Dr. William P. Herbst Jr. was chosen president-elect of the Medical Society of the District of Columbia during the annual business meeting of the society in May. Dr. William E. Clark took over the office of president on July 1. Other officers include Drs. Fred A. J. Geier and Dorothy S. Jaeger, vice presidents; Coursen B. Conklin, delegate to the American Medical Association, and Archibald L. Riddick, alternate. Dr. William M. Ballinger had been acting as president of the society since Lieut. Col. James N. Greear Jr., M. C., was ordered overseas several months ago.

Progress of George Washington University Hospital.—The new George Washington University Hospital will be ready for occupancy in about eighteen months, according to the *Medical Annals*. The 400 bed structure, six stories high, will be equipped and managed as a teaching hospital, replacing an older building in use since 1898. It was made possible by a federal works agency grant in the amount of $2,700,000. Mr. Leo G. Schmelzer, who was recently appointed superintendent of the hospital, will supervise the construction and equipment, assisting Dr. Walter A. Bloedorn, dean of George Washington University School of Medicine and medical director of the hospital.

ILLINOIS

A. L. Bowen Dies.—A. L. Bowen, formerly director of the state department of public welfare, died in Elgin July 8, aged 75.

Counties Vote for Health Departments.—McLean and Montgomery counties voted in their June elections to establish their own permanent health departments under the provisions of the Searcy-Clabaugh county health department law. Other counties in the state which had previously voted for their own health units include Adams, DuPage, Edwards, Lawrence, Morgan and Wabash counties.

Temporary Health Commissioner for Peoria.—Dr. George P. Gannon, U. S. Public Health Service, formerly of Pittsburgh and more recently state venereal disease control officer in Denver, has been appointed temporary health commissioner of Peoria. He will continue in this position until the return of Dr. Sumner M. Miller, who is away because of ill health. Dr. John L. Lincoln, U. S. Public Health Service, held the position until the appointment of Dr. Gannon.

Chicago

The Allergy Unit at Illinois College of Medicine.—The University of Illinois College of Medicine has devised a plan for using in a consultative and teaching capacity its various departments. The Allergy Unit is composed of specialists in the fundamental and clinical branches of medicine. William H. Welker, Sc.D., head of the department of physiologic chemistry, is the director of research in the fundamental sciences. Under him are men who have gained recognition in bacteriology and immunology, in botany, in immunochemistry and in pharmacology. The clinical division of the Allergy Unit is headed by Dr. Ben Z. Rappaport, who will devote half of his time as director of clinical investigation and clinical head of the Allergy Unit. Dr. Adolph Rostenberg Jr., a dermatologist, is the associate director of clinical investigation and is appointed on a full time basis. In addition, there are in the Allergy Unit specialists in pediatrics, rhinology, ophthalmology and psychiatry. Supervised training by the staff in the fundamental sciences and by the clinical staff will prepare selected students in the subjects of biochemistry, immunology and botany as related to allergy. The primary training in allergy will be supplemented by training in clinical medicine, pediatrics and dermatology together with a fundamental understanding of otolaryngology and psychiatry. The period of training following the completion of an internship will be for three years on a full time basis or for an equivalent length of time if the training is taken on a part time (half time) basis. Two full time allergy research assistantships at $1,200 to $1,800 a year will be established. When the new building program is completed it is hoped that provision will be made for residence in the hospital for the senior of the two research assistants. During this period of training it is expected that the research assistant will be registered for graduate work and conduct research work equivalent to a year of graduate residence with the completion of a satisfactory thesis for the M.S. degree. The emphasis from the clinical standpoint will be placed primarily on clinical medicine, which training will be continued throughout the three year period. The first year will be devoted to clinical medicine and attendance in the Allergy Clinic. In addition, the student will attend the seminars in allergy, biologic chemistry and clinical medicine. In the second year the training in clinical medicine will be continued. Six months, half time basis, will be spent in pediatrics, four months in dermatology (half time) and two months on a half time basis in laryngology, rhinology and otology. Work on a research problem will be initiated. Attendance in the Allergy Clinic and the seminars in allergy, biologic chemistry and clinical medicine will be continued. A training course of six months will be given either as a separate subject to students who are well trained in internal medicine, pediatrics, dermatology or otolaryngology or as a subject supplementing any one of these courses taken by the student. Such a course will be planned especially for men who return from military service to give them an appreciation of allergy as a specialty, either separately or in conjunction with any of the related fields. The practice of allergy is primarily confined to office work. It is therefore one of the specialties suitable for physically handicapped physicians who might find it difficult to do the type of work requiring house calls. The large number of people who are allergic (about 10 per cent of the total population) and the relatively small number of specialists in this field will in all likelihood be additional reason for the choice of allergy as a specialty. The six month course will also meet the requirements of graduate students in pediatrics, dermatology or otolaryngology who may desire to study allergy as a supplementary subject. Qualified students may apply for study in biochemistry, bacteriology or immunology under the direction of the fundamental science staff of the Allergy Unit. A research assistantship ($1,800 a year) may be available for exceptional students who have an M.S. degree and who qualify for study toward a Ph.D. degree. The funds for the establishment of the Allergy Research Unit were provided by several donors. First, the nucleus and major portion was provided by the Field Foundation. This consisted of $23,000. Additional funds were obtained from the Asthmatic Children's Aid of Chicago. Finally, a large portion of the fund came from private patients who were interested in furthering investigative work.

INDIANA

School for Crippled Children Named for Harry Mock.—The Harry Mock School for Crippled Children was recently opened in Muncie under the sponsorship of the Delaware County Crippled Children's Association in cooperation with the city. The school was named for Dr. Harry E. Mock, Chicago, who was born in Muncie, where he later went to school. Dr. Mock, who served as a colonel in the medical corps during World War I, in charge of rehabilitation of disabled soldiers, wrote a "Creed of the Handicapped," which had been adopted as the motto for the school named in his honor. It reads:

> Once more to be useful; to see the pity in the eyes of my friends replaced by commendation; to work, produce, provide—seeking no favors and given none—a man among men in spite of my physical handicap.

Woman Enjoined from Practicing Medicine.—The state board of medical examination and registration was upheld in an injunction action seeking to restrain Della Moser, Decatur, from practicing medicine without a license. Judge W. H. Eichhorn of the Wells Circuit Court at Bluffton in his decision found in favor of the state medical board. According to newspapers, June 19, a motion by the defense attorney to arrest judgment on the findings was overruled and judgment was entered against Miss Moser prohibiting her from the practice of medicine without a license. The state contended, it was stated, that her treatment of persons at Decatur constituted the practice of medicine, while the defense contended that she did not go further than to manufacture medicines under a state permit authorizing her to do so. It was further contended that she sold customers only what they asked for and that she did not prescribe or give treatments.

KANSAS

Personal.—Dr. Clay E. Coburn, Kansas City, was recently guest of honor at a dinner given by the Kansas State Tuberculosis and Health Association in recognition of his service as an officer of the association for twenty-five years, during eleven years of which he held the presidency.——Dr. James D. Colt Jr., Manhattan, has been appointed a member of the state board of medical registration and education for a four year term expiring April 30, 1949. Drs. Harry L. Aldrich, Caney, and George I. Thacher, Waterville, were named to the board for three year terms expiring March 31, 1948.

Health Education Council Recommended.—The establishment of a Kansas Health Education Council was recommended recently, to be composed of twenty members, with Governor Andrew F. Schoeppel to serve as honorary chairman and with certain executive officers of the state board of health to serve as ex officio members. The recommendation was the result of a school health study which has been under way for the past year under the direction of Clair E. Turner, Dr.P.H. (THE JOURNAL, March 24, p. 723). In addition to the council it was recommended that an advisory committee be formed, the committee to consist of one member representing each of the fifty-three statewide organizations that have participated in the study.

MAINE

State Medical Election.—Dr. John O. Piper, Waterville, was chosen president-elect of the Maine Medical Association at its meeting of the house of delegates in Augusta, June 24. Dr. Adam P. Leighton, Portland, was installed as president. Dr. Frederick R. Carter, Portland, is secretary-treasurer. Speakers at the meeting were Dr. John J. Moorhead, New York, who discussed his impressions of the attack on Pearl Harbor, which occurred while he was there, and Dr. Albert S. Crawford, Detroit, who spoke on "Nerve Compression Syndrome of Lumbar Nerves: Modern Concepts and Surgical Treatment."

MINNESOTA

Resolution on Operating Room Privileges.—The board of directors of Asbury Hospital, Minneapolis, has approved for operating room privileges physicians of Minneapolis who are fellows of the American College of Surgeons, surgical specialists certified by the American boards and physicians of the city who, on the basis of training and experience in surgery, have been recommended by the operating room committee and the medical advisory board of the staff and the superintendent of the Asbury Hospital. This list shall be kept up to date in the records of the board of directors and a copy of this list shall be posted in the office of the operating room supervisor for guidance in scheduling operations. No operation shall be scheduled under the name of any doctor not on this list except by special permission from the superintendent of the hospital to the operating supervisor in each instance.

NEW HAMPSHIRE

Industrial Health Law.—Authority was granted to the State Department of Health of New Hampshire to engage in industrial hygiene by a law signed by Governor Charles M. Dale May 15. According to the *Industrial Hygiene News Letter,* rules and regulations relating to industrial health are authorized to be made by the health department and enforced by the state department of labor. Under the new act the health department may investigate all mines, quarries, foundries and industrial establishments employing five or more persons in manufacturing or processing of goods, in order to determine what health hazards may exist from noxious gases, fumes, dusts or other toxic materials. A penalty clause provides for fining employers who refuse to comply with rules and regulations formulated under the act, which took effect on its passage.

NEW YORK

School for Physical Therapists.—Albany Hospital, Albany, has established a new school for the training of physical therapists. The period of study is nine months, with a preclinical course of three months and a clinical course of six months. It consists of both didactic lectures and practical work carried on in the Albany Hospital and the Albany Medical College and affiliated institutions. The course will be given twice yearly, the first class to be admitted Sept. 12, 1945 and the second on March 13, 1946. Additional information may be obtained from Dr. John W. Ghormley, medical director of the school. Miss Catharine Graham is the technical director.

Personal.—Dr. Arthur J. Redmond has been appointed medical officer at the University of Rochester's college for men and for the men students at the Eastman School of Music. He succeeds Dr. Edwin Fauver, who recently retired as college physician and head of the physical education department but who will continue as an instructor in the medical school (THE JOURNAL, May 26, p. 300). Lieut. George P. Heckel (MC), U. S. Naval Reserve, will continue as medical officer for the Navy V-12 unit at the river campus and will share with Dr. Redmond the medical duties in connection with the welfare of the university's athletic teams.——Dr. Robert F. Korns, Amsterdam, former epidemiologist in the division of communicable diseases, New York State Department of Health, has been made acting associate director of the division for the duration of the war. He fills the vacancy that occurred when Dr. Herman F. Senftner, Albany, retired after twenty-eight years of service. Dr. Korns took over his new activities May 1.

New York City

Memorial to Physician.—The residuary estate, after a number of bequests, of Mr. Alfred F. Heim, who died June 11, will go to Cornell University for free scholarships to be known as the "Dr. John A. Heim Scholarship" in honor of his son, the late Dr. John A. Heim. Lenox Hill Hospital will receive a bequest of $5,000, also to be set up as a memorial to Mr. Heim's son.

Louis Pink Named Insurance Adviser for Philippine Government.—Louis H. Pink, president of the Associated Hospital Service of New York and formerly superintendent of insurance of the state of New York, has been given a leave of absence until September to serve the Philippine government as a special adviser in reorganizing the insurance industry of the Philippines.

Medical Service for Small Industries.—The first step in a proposed program to provide medical service for small industries has been taken by the special committee on industrial medicine of the Medical Society of the County of New York. Questionnaires are being issued to members of the society to determine what physicians would be interested to engage in this type of work and to assist the committee in developing a program to provide medical service for small industries.

Personal.—Erwin F. Fauser, executive vice president and general manager of William R. Warner & Company, Inc., manufacturing pharmaceutists, was elected president of the company to succeed Marvin R. Thompson, Ph.D., who resigned recently (THE JOURNAL, June 23, p. 605).——Dr. Samuel T. Orton, who gave the principal address during the commencement exercises of the University of Pennsylvania School of Medicine, Philadelphia, June 18, received on this occasion the honorary degree of doctor of science from the university.

Form Society for the Study of the Blood.—The Society for the Study of the Blood was organized at a meeting at the New York Academy of Medicine, June 14, with Drs. Alexander S. Wiener president, Paul Reznikoff vice president and Peter Vogel secretary-treasurer. The society will concern itself with problems in the allied fields of clinical and experimental hematology, blood grouping and transfusion. Three scientific meetings will be held a year. At the first meeting the speakers were Drs. Nathan Rosenthal on "The Development of Hematology in New York City"; Eugene R. Marzullo, "The Role of the Hematologist in the General Hospital," and Lester J. Unger, "Blood Banks of the Future."

Teaching and Research Fellowships Available Through Eye Bank.—Teaching and research fellowships to extend the knowledge and skill required for the delicate operation which restores sight to a blind person with a corneal defect through the grafting of healthy corneal tissue will be established in leading medical schools throughout the country by the Eye-Bank for Sight Restoration, it was announced July 16. The initial grant of $25,000 has been made by the Milbank Memorial Fund to enable the eye bank to function pending the time when the importance of the undertaking may gain recognition in widespread support, it was stated. It is hoped that financial support would be forthcoming from the general public in sums of any amount.

OHIO

Dickinson Models of Human Reproduction Acquired by Health Museum.—The Cleveland Health Museum has acquired the 100 R. L. Dickinson sculptural models for human reproduction for display and distribution to medical, nursing and health groups. The acquisition was made possible through the Prentiss Foundation, created by Elizabeth Severance Prentiss, who gave the original building to the museum, contributed to it while living and left an endowment on her death in January 1944. The collection, which is the result of sixty years of study and research by Dr. Robert L. Dickinson, New York, is based on life studies as contrasted with measurements based on postmortem examinations. It includes standard figures of the adult male and female and of the newborn baby; pregnancy and labor; anatomy of male and female reproductive organs; venereal diseases; some surgical operations; full-sized manikin for teaching medical students delivery; the World's Fair series of childbirth in successive stages; six small models for the doctor's desk for explanation to patients or students, and others for specialized uses. In the transaction the museum acquires possession and control of distribution of the models and an option on further additions to the collection, placing the museum in a position to make copies from the original for other institutions.

OKLAHOMA

Course in Surgical Diagnosis.—Dr. Patrick P. T. Wu, formerly assistant professor of surgery at Peiping Union Medical College and recently a fellow in surgery at the Mayo Clinic, Rochester, Minn., recently conducted a postgraduate course in surgical diagnosis in Guthrie, Stillwater-Cushing, Ponca City, Pawhuska and Bristow-Sapulpa. On completion of the course, which was given under the auspices of the Oklahoma State Medical Association, Dr. Wu was planning to return to Hong Kong, China.

Changes at University of Oklahoma.—The recent passage of appropriations bill 101 makes available $1,432,503 for construction of buildings, improvements and purchase of equipment for and at the University of Oklahoma School of Medicine and Associated Hospitals. In a report to the appropriations committee, Dr. Tom Lowry, dean of the medical school, recommended that the needs of the school of medicine be portioned in the following manner:

$375,000 for the school of nursing.
$175,000 for the isolation wing.
$75,000 for the Outpatient Department.
$400,000 for additional hospital beds.
$225,000 for an annex to the medical school.
$100,000 for remodeling, heating, power plant, laundry and shops.

The passage of house bill 200 changes the name of the Confederate Home, Ardmore, to the Southern Oklahoma Hospital, to be under the supervision of the University of Oklahoma. A $250,000 appropriation will be used to match a similar total from the citizens of Ardmore; this total, it is hoped, will be matched with a similar appropriation from federal funds. Dr. George N. Barry has resigned as medical director of the State University Hospital and the Crippled Children's Hospital, in order to be available for a commission in the U. S. Navy. He has been a member of the staff at the hospital since 1937 and medical director since 1941. Dr. Barry has been granted a leave of absence from the medical school as assistant professor of clinical medicine.

RHODE ISLAND

Supreme Court Upholds Examining Board.—The supreme court of the state of Rhode Island has affirmed the action of the state board of examiners in medicine in revoking the license of Dr. Charles Jacobson, Providence. Dr. Jacobson appealed from the decision of the board to the supreme court. After a hearing before the full court, the appeal was denied in a rather lengthy opinion.

Francis Blake Receives Chapin Award.—Dr. Francis G. Blake, dean and Sterling professor of medicine, Yale University School of Medicine, New Haven, Conn., was presented with the Charles V. Chapin Memorial Award of the city of Providence for 1945, May 16, during the one hundred and thirty-fourth annual meeting of the Rhode Island Medical Society. The presentation was made by Hon. Dennis J. Roberts, mayor of Providence. Dr. Blake gave the annual Charles V. Chapin Oration before the medical society, on "Some Recent Advances in the Control of Infectious Diseases." The presentation of the award followed the oration. The award and the oration honor the late Dr. Chapin, who was superintendent of health of Providence for forty-eight years.

TEXAS

Proposed Advisory Council.—Dr. Edward H. Cary, president of the Southwestern Medical Foundation, Dallas, announced recently that an advisory council was to be formed soon to help acquaint the public of the Southwest with the program to build a great medical center in Dallas, it is reported. Both lay and medical representatives from each county of Texas and from adjoining states which the medical center proposes to serve will comprise the council.

Personal.—Dr. John T. Lawson, Bowie, was recently appointed a member of the state board of medical examiners for a term of six years. Dr. Lawson served as a member of the board from 1936 to 1942.——Dr. Tip M. Collins, Big Spring, recently completed fifty years in the practice of medicine.——Dr. Henry A. Petersen, Houston, was elected president of the Houston School Board recently.——Dr. Benjamin F. Arnold was recently appointed health officer of Greenville.——Dr. David Grady Deaton, Houston, has been appointed full time director of the Harris County Public Health Unit.

Merger of Hospitals.—The Medical and Surgical Memorial Hospital, San Antonio, operating under a nonprofit charter, has absorbed the Physicians and Surgeons Hospital. The trustees have arranged to erect a clinic building and establish a medical center operated on a nonprofit basis. The clinic will be supported by the hospital until it can become self sustaining, but it will not be run as a part of the hospital. Work will begin as soon as possible on a three story addition to the Medical and Surgical Hospital office building to provide accommodations for the clinic. According to the San Antonio *Evening News*, June 29, the enlarged hospital will have 215 beds. There are 150 at the Medical and Surgical Hospital and 65 at the Physicians and Surgeons Hospital. The two properties, situated on the opposite sides of Camden Street, may be linked by an underground passage. The Medical and Surgical Memorial Hospital was organized in 1927; the present organization was created in 1934 and was issued a charter by the state.

WEST VIRGINIA

Personal.—Dr. Harry A. Garrison has resigned as superintendent of the Weston State Hospital (mental), Weston, effective July 1, having held the position since Aug. 1, 1943, when he succeeded Dr. John E. Offner, Weston, who resigned to become state health commissioner. Dr. Homer O. Van Tromp, French Creek, has been named acting superintendent.

State Association Creates New Committees.—Dr. David Salkin, superintendent of Hopemont Sanitarium, Hopemont, has been named chairman of the new tuberculosis committee created by the house of delegates of the West Virginia State Medical Association at its meeting in May. Other members of the committee include Drs. Eustace T. Goff, Parkersburg; John N. Reeves, Charleston; George E. Gwinn, Beckley, and Sarah Elizabeth McFetridge, Shepherdstown. The new committee on relocation and reestablishment of doctors returning from service was also created with Dr. Wade H. St. Clair, Bluefield, as chairman. Other members include Drs. James P. McMullen, Wellsburg; Benjamin I. Golden, Elkins; Thomas Kerr Laird, Montgomery; Eugene C. Hartman, Parkersburg, and Hugh A. Bailey, Charleston.

HAWAII

Board of Health Publishes Annual Report.—The board of health of the Territory of Hawaii has issued its annual report for the fiscal year ended June 30, 1944. Dr. Charles L. Wilbar Jr., Honolulu, president, emphasizes that the report covers a wartime period. Infant mortality, maternal mortality and stillbirth mortality reached new all time lows during the year. The infant mortality rate was 31.3 per thousand live births as compared with 40.2 for the previous year and the previous record low of 38.6 for 1942. The maternal mortality rate was 1.97 per thousand live births compared with 2.28 for 1943 and the previous record low of 1.98 for 1941. The stillbirth mortality rate was 16.1 per thousand live births compared with 17.9 for 1943 and the previous record low of 17.39 for 1941. The overall civilian death rate in the period reached an all time low of 6.1 per estimated thousand of population, which, according to the report, is a lower death rate than has ever been recorded for any state. It is pointed out, however, that this does not mean that people are less likely to die in Hawaii than on the mainland but rather that the low death rate reflects the presence of large numbers of young people. The overall death rate including military personnel would be 7.4 for the year if the same number of persons were included as in prewar days, but this is a misleading figure as it includes military deaths from the whole area without considering the present military population. Deaths of military personnel stationed in the area are reported to the health department, but, according to the record, the department has received no figures on military population since the beginning of the war. The report states that accidental deaths have moved into first place instead of deaths due to heart disease in the ten leading causes of death for the 1943-1944 fiscal period. Deaths from tuberculosis have moved into fourth place ahead of deaths due to congenital malformation and diseases in early infancy. The figure on accidental deaths is somewhat misleading in the overall picture in that several large scale military accidents are included. If these were excluded, accidental deaths would be in fifth place. The ten leading causes and their rates for 100,000 of population are:

Accidental deaths 150.9 as compared with 112.6 for the previous year.
Heart disease 125 as compared with 121.1 in 1943.
Cancer 76.5 as compared with 63.5 in 1943.
Tuberculosis 57.6 as compared with 56.6 in 1943.
Congenital malformations and diseases of early infancy 53.1 as compared with 61.2 in 1943.
Nephritis 48.2 as compared with 47 in 1943.
Cerebral hemorrhage 41 as compared with 43.6 in 1943.
Pneumonia 32.2 as compared with 35.5 in 1943.
Suicide 20.1 as compared with 20 in 1943.
Diabetes mellitus 16.6 as compared with 16.5 in 1943.

GENERAL

American-Soviet Medical Society in New Offices.—As of September 1 the new address of the American-Soviet Medical Society will be 58 Park Avenue, New York 16. The offices will be located in the American Russian Institute Building. The society will occupy the entire sixth floor penthouse and will have facilities for its library and research workers, business office and editorial departments.

Biography of Dr. Joseph B. De Lee.—Authors are now at work on a biography of the late Dr. Joseph B. De Lee. They are anxious to receive copies of correspondence or other documentary material which would be useful for inclusion in such a biography. Material may be sent to Dr. Sol. T. De Lee at 5028 South Ellis Avenue, Chicago. Any material that is sent will be carefully preserved and will be returned on request to those who sent it. Due acknowledgment will also be made for such material as is used.

Changes in Rockefeller Institute.—The board of scientific directors of the Rockefeller Institute for Medical Research, New York, announces the following promotions and appointments, among others:

Dr. Charles L. Hoagland, New York, to member.
Lyman C. Craig, Ph.D., New York, to associate member.
Lewis G. Longsworth, Ph.D., New York, to associate member.
Theodore Shedlovsky, Ph.D., New York, to associate member.
Dr. Paul B. Hamilton, New York, to associate.
C. Arthur Knight Jr., Ph.D., Princeton, N. J., to associate.

New appointments include:

Henrik Dam, D.Sc., Rochester, N. Y., associate member.
Dr. Maclyn McCarty, New York, associate.

Narcotic Violations.—The U. S. Bureau of Narcotics announces the following actions:

Dr. Henry C. Chalmers, Brookneal, Va., pleaded guilty in the U. S. District Court at Lynchburg, Va., June 4 to violation of the internal revenue code; his sentence was suspended and he was placed on probation for a period of three years on condition that he surrender his narcotic special tax stamp.

Dr. Edward Harmon Teed, Coeur d'Alene, Idaho, was convicted at Coeur d'Alene of violation of the federal narcotic law; on June 2 he was sentenced to a term of one year and one day and was fined $2,500. The penitentiary sentence was suspended and Dr. Teed was placed on probation for a period of one year.

Dr. Henry Raymond Gross, Chicago, pleaded guilty to violation of the federal narcotic law and on June 1 was sentenced to a term of three years; his sentence was suspended and Dr. Gross was placed on probation for a period of three years.

Dr. James Franklin Johantgen, Talladega, Ala., pleaded guilty in the U. S. District Court to violation of the Harrison narcotic law and on June 8 was fined $200 and placed on probation for a period of five years.

Dr. Benjamin F. Lazenby, Treece, Kansas, pleaded guilty in United States District Court at Wichita, Kan., to violation of the Harrison Narcotic Law and on May 7 was fined $100.

Prevalence of Poliomyelitis.—Reports of cases of poliomyelitis for the week ended July 7 have been received from the division of public health methods, U. S. Public Health Service, as follows:

Maine	1	West Virginia	2
New Hampshire	2	North Carolina	1
Vermont	..	South Carolina	6
Massachusetts	1	Georgia	5
Rhode Island	..	Florida	..
Connecticut	7	Kentucky	1
		Tennessee	13
New York	21	Alabama	5
New Jersey	10	Mississippi	1
Pennsylvania	..		
		Arkansas	..
Ohio	5	Louisiana	3
Indiana	..	Oklahoma	6
Illinois	2	Texas	21
Michigan	3		
Wisconsin	..	Montana	1
		Idaho	..
Minnesota	..	Wyoming	..
Iowa	2	Colorado	..
Missouri	1	New Mexico	..
North Dakota	1	Arizona	..
South Dakota	..	Utah	..
Nebraska	..	Nevada	..
Kansas	1		
		Washington	..
Delaware	1	Oregon	..
Maryland	3	California	18
District of Columbia	..		
Virginia	5	Total	154

Basal Temperature Records to Aid Infertility Treatment.—A basal temperature record to aid in determining the probable time of ovulation in individual women is being made available by the medical committee of the Planned Parenthood Federation of America to physicians interested in the treatment of infertility and the planning of conception. As reported by Dr. Pendleton S. Tompkins, Philadelphia, in THE JOURNAL (March 11, 1944, p. 698) it has been found that an accurate daily record of basal temperature is valuable in estimating the optimal time for conception. There is a slight rhythm of variation in the normal temperature of a healthy woman, the temperature being lower during the first half of the menstrual cycle than during the latter half. The transition from the lower level to the higher one occurs at about the time of ovulation. In many cases the temperature will show a sharp drop and then shoot immediately to the higher level, which can be taken as an indication that ovulation is taking place. As the variation for the entire cycle may be less than half a degree, the patient must be provided with complete instructions and forms with which to plot her temperature accurately. The temperature is taken rectally each morning immediately on awaking before the patient has got out of bed, talked, eaten, drunk or smoked. The charts, as provided by the Planned Parenthood Federation, provide for a six months record. They indicate the calendar months, the length of the individual cycle and the number of days backward from the onset of the menses at which ovulation can be estimated to occur. The charts, together with the instruction forms for patient use, are available at cost through the medical department, Planned Parenthood Federation of America, 501 Madison Avenue, New York 22.

FOREIGN

Three Medical Schools to Be Opened in Reich.—Three of seven German medical schools, including the University of Heidelberg, will open September 1, Major Gen. Morrison C. Stayer stated July 15, if the necessary equipment, a faculty and coal to heat the buildings can be assembled, newspapers reported. General Stayer, chief of public health branch G-5, United States forces in the European theater, said there was a serious need in Germany for well educated physicians and surgeons, as German medicine declined badly during the Hitler period. He said that in order to protect the health of allied troops it is necessary that German health be kept at a high level. He added that many German prisoners were in bad health. General Stayer said that present plans call for the matriculation of 300 doctors for advanced training at Heidelberg, 500 students at Marburg University and 300 students at Erlangen University, adding that the other schools were too badly damaged to function.

Foreign Letters

LONDON

(From Our Regular Correspondent)

June 16, 1945.

The Teaching of Pediatrics

A pediatric committee of the Royal College of Physicians has presented an important report on the teaching of pediatrics. It suggests that the student's attention should be directed to the growth and development of children while he is still learning biology, physiology and anatomy and that the diseases peculiar to childhood should find a place in his studies of pathology and psychology. In his midwifery course he should be taught by a pediatrician about health and disease in the newborn. He should also spend eight sessions at a child welfare center, where he will be taught by a pediatrician or a suitably qualified maternity and child welfare officer. Courses in the care of the newborn and in child welfare should precede his course in general clinical pediatrics, which should occupy not less than a third of his whole time given to clinical medicine and should include a resident period of a month. In the study of social medicine the social services dealing with children should be given proper weight, so that the student may gain some insight into the school medical service, child guidance centers and children's courts.

THE TEACHING UNIT

The report holds that a hospital center, closely linked to a university and with a separate children's hospital attached to it, has much to recommend it. A university department of pediatrics, housed in a children's hospital, would forward teaching and research. Alternatively the university pediatric department might be developed as part of a general undergraduate teaching center admitting 80 to 100 students a year. In any case it should have at least 100 beds for general medical and surgical cases and possibly additional beds for tonsillectomy. At least 20 more beds should be set aside for infectious diseases, and the department should be linked to an appropriate fever hospital. Students should also have access to rheumatic heart homes, orthopedic hospitals and institutions for tuberculous children, so that they can study disease in childhood, and they should see rehabilitation applied in convalescent homes. In London much larger children's units will have to be developed in many medical schools; meanwhile students should get the necessary experience in children's hospitals. In provincial schools the children's hospitals will provide the main teaching in pediatrics, though these should in due course become university centers. The staff of the children's department should consist of a whole time director of professional rank, a whole time senior assistant, a registrar and a resident house officer. Also there should be two part time pediatricians of the standing of physicians or assistant physicians. A senior pathologist should take a special interest in the pathology of children's diseases, and similarly a senior radiologist in x-ray examinations.

Fellowships to Promote the Study of the Maintenance of Health

The Nuffield Foundation announces yet another benefaction. It proposes to award a number of medical fellowships to help promising men and women who wish to follow an academic career in social medicine, child health, industrial health and psychiatry to obtain at home or abroad the necessary postgraduate training and experience. More men and women trained in research and teaching are needed to secure the continued advance of medical knowledge and the standard of medical education. The foundation believes that there is a special need for carefully selected persons to have opportunities for studies which relate to the promotion and maintenance of health as distinct from the recognition and treatment of established disease. It hopes that the fellowships being offered will help to meet this need.

Normally the annual value of a fellowship will be between $2,500 and $4,000. It may be awarded for one or more years but as a rule for not longer than three years. Candidates must hold a university degree in medicine registerable in Britain and have had general clinical experience since qualification. In order that doctors serving overseas may not be at a disadvantage, the trustees have refrained from requiring applications to be submitted by a specified date. Medical officers serving with the armed forces may apply now for fellowships tenable on demobilization.

Emergency Rations for Polar Flights

For the polar flights of the British airplane *Aries* it was decided to provide emergency rations sufficient to last the crew of 9 for twenty-eight days. These were designed and prepared by the Low Temperature Research Station of the Department of Scientific and Industrial Research in consultation with Wing Commander Macrae of the Air Force Institute of Pathology and Wing Commander Winfield of the Air Force Institute of Aviation Medicine, who was medical officer on the flights. As the normal rations would have been too heavy and bulky, dehydrated foodstuffs were adopted. These were in the form of 2 inch tablets wrapped in waxed films. Each on addition of water gave a ready made meal and there was sufficient range to provide four different menus. For example one menu for lunch was meat and vegetable stew, fruit, biscuits, butter and tea. The total weight of the rations was 393 pounds. It was found that rations for two days could be packed in a standard 4 gallon can, which not only was convenient but also could be gas packed to ensure that the food remained in the best condition possible.

Pulmonary Embolism in Liberated Prisoners of War

In a communication to the *Lancet* (June 2, p. 703) H. L. Miller calls attention to a condition that does not seem to have been previously observed in the war. Between May 1 and May 9 about 300 men were admitted to a hospital in this country suffering from the effects of privations as prisoners of war in Germany. About 200 were stretcher cases. In only 2 was the malnutrition severe enough to cause anxiety, but it was noticed during the first week that the majority had fever. One of them died in five minutes of pulmonary embolism, which was confirmed by necropsy. He had been allowed up for a day or two but had been put back to bed because of recurrence of edema of the legs. Nine days after admission another man died of pulmonary embolism six hours after the first manifestation. The question arose whether some of the symptoms and signs noted in the other men were not also due to pulmonary embolism. Most of the men had marched 500 to 1,000 miles between January and May on very short rations. During the last month of the march almost all of these developed diarrhea and swelling of the legs. The edema was usually limited to the lower shin but sometimes extended above the knee and in some was asymmetrical. Among the symptoms which they developed were paroxysmal dyspnea while at rest, chest oppression or pain, palpitation, cough (with hemoptysis in at least 1 case) and sudden collapse. The diagnoses made by the medical officers who examined the prisoners after liberation included pleural effusion, bronchitis, bronchopneumonia, lobar pneumonia and pulmonary tuberculosis. There were cases of sudden death and "pneumonia that kills in a few hours."

The signs remaining in the chest on admission to the hospital were in some attributed at first to unresolved pneumonia or atypical pneumonia, but the hospital staff now suspect that at least a proportion were the result of pulmonary infarction.

Some of the other signs so often seen in these ex-prisoners—slight cyanosis of the lips, pyrexia, tachycardia—may have been caused by small emboli without infarction. Paul White, who believes that pulmonary embolism commonly goes unrecognized, states that its principal cause is thrombosis of the leg veins, beginning as a rule in the calf and extending to the long saphenous and femoral veins. Such thrombosis would explain the edema developing in these prisoners as their malnutrition increased. After the war of 1914-1918 an increase of pulmonary embolism was attributed by Burwinkle to malnutrition.

PARIS

(From Our Regular Correspondent)

June 17, 1945.

Repatriation

The problem of repatriation of prisoners of war, of political or racial deportees, of supposedly voluntary workers and those recruited by force, who find themselves in Germany, presents an urgent problem to the French government. Even if limited to its health aspects and the demographic consequences, this problem is immense. Arrangements had been made and a plan of action decided, but the débacle of Germany has been so rapid and the prisoners and their families are so anxious to be reunited immediately that all plans were sidetracked.

There were various groups to be repatriated. The sick and wounded numbered about 250,000; more had already been cared for in Germany and had been liberated through the intervention of the International Red Cross. Others were still under treatment in German hospitals but could not be transported. There were many political transportees and "voluntary" workers. The majority of them were not patients in the strict sense of the term, but the suffering which they had to endure makes them practically convalescents, who have to be treated with special consideration. There were a million of such convalescents.

The return of these exiles took place by land, by sea (especially those who were liberated by the Soviet armies) or by air. Many of them had at the time of their liberation started on foot toward France, escaping from all control. It has been estimated that there were 15 million foreigners in Germany, and about 6 million of them spontaneously took to the road.

About 150 advance posts were organized quickly on the German roads, where the first selection was assured and where some urgent care could be given. There the repatriates were given instructions and directions. At the border itself, at the principal points of arrival by sea, by land and by air, health stations were created which directed them to regulatory stations as the last halting place before their return home. These health stations not only had to assure the administrative registration of the repatriates but also had to determine the control of this heterogeneous mass of refugees, their present and future health, the immediate care to be given them, the supervision to which they had to be subjected on their way home, their present capacity for work and the recuperation from which they were to benefit. The health supervision which they required was assured by the local health authorities, and a new examination was planned after six months. It was necessary that the examination on entrance into France should be complete and made moreover with all the caution merited. Everything was done in as simple a manner as possible to avoid any unnecessary delay.

They proceed first to the police department, where after identification their administrative papers are set up. Then they are undressed and their clothing is disinfected either by DDT or by fumigation. Then they receive a prolonged hot shower and a thorough soaping, followed by drying in hot air after a careful rinse. At this time those with scabies were marked and were painted with benzyl benzoate. Then came weighing and measuring and vaccination against smallpox. An orderly obtained 10 drops of blood from the ear lobe, and the slide with this blood was sent to the laboratory for a Kline test, which was chosen because it is especially rapid and sensitive. After this the medical examination is completed by roentgenography or by fluoroscopy if indicated by special examinations.

With the health record established, the repatriates are directed either to the hospital if they need treatment urgently or for a more thorough clinical examination, while the rest are sent to the regulatory station for their return home.

TUBERCULOSIS

Some 2,500,000 persons had to be examined rapidly. The first step was to make an x-ray examination. It was impossible to carry this examination out in Germany, where equipment and personnel were lacking. The task was performed in the frontier posts. Roentgenography is preferred over fluoroscopy because it is made more easily on large numbers and there remains an authentic document. Fluoroscopy is reserved for particular cases. A regular control is assured to the personnel who work in the radiologic crew. This systematic search for tuberculosis has proved fruitful; according to preliminary statistics on 24,695 repatriates of the department of the North, the mortality rate and the morbidity were double that in the other war. After the examination with x-rays, all the suspected cases are called to the attention of the health office of their home district and they will be subject to inquiry and supervision and will receive care when they need it. Convalescent homes and sanatoriums will be open for them.

SYPHILIS

Even when the presence of a contagious lesion was established, the serologic reaction was determined. Treatment was not enforced nor was return home delayed. Those infected were urged to obtain treatment. The health authorities at the patient's home were notified for future supervision.

CANCER

The great majority of repatriates are young men. Thus it was the more surprising to detect in them carcinomatous manifestations. Cancer, of course, is not necessarily a disease of mature age. Unfortunately the means of rapid and systematic detection of cancer have not been perfected as yet.

Marriages

Rush E. Netterville, Wilkinson, Miss., to First Lieut. Frances Foil McAllister of Mount Pleasant, N. C., in Epinal, France, April 12.

Guthrie Yoehlee Graves, Bowling Green, Ky., to Miss Elizabeth Hannan Ellis of Hopkinsville, June 9.

James C. Spalding, Lebanon, Ky., to Miss Arminta Scott of Corinth, Miss., in Nashville, Tenn., June 2.

Charles Samuel McCammon, Maryville, Tenn., to Miss Mary A. Thornburgh of Knoxville, June 14.

Harold Frederick Bertram, Memphis, Mo., to Miss Margaret Baden Patterson of Baltimore, May 7.

John Harvey Nicholson, Statesville, N. C., to Miss Gertrude James May in Richmond, Va., June 2.

George H. McSwain, Paris, Tenn., to Miss Mary Jane Allred of Bowling Green, Fla., May 27.

John Milton Mook, Metuchen, N. J., to Miss Jean Marie Wallace of Nashville, Tenn., June 12.

John Covington Tinsley Jr., Lynchburg, Va., to Miss Ellen Luberger of Wyoming, Ohio, June 9.

Frank J. Pickett, Joplin, Mo., to Miss Yvonne Best of Vandalia, Ill., in St. Louis, June 8.

Russell Dorris Ward to Miss Margaret Virginia Bowen, both of Nashville, Tenn., June 8.

Jerome J. Romagosa to Miss Ethyl Mae Litton, both of Opelousas, La., Nov. 4, 1944.

Deaths

Horace Newhart ✠ Minneapolis, authority in otology, died July 9, aged 72, of cancer.

Dr. Newhart was born in New Ulm, Minn., Dec. 9, 1872. He studied in the New Ulm public schools, Carleton College and Dartmouth College and graduated at the University of Michigan Department of Medicine and Surgery, Ann Arbor, in 1898. Intermittently until 1912, when he joined the faculty of the University of Minnesota School of Medicine, he engaged in graduate study in Vienna. At the time of his death he was professor emeritus in otolaryngology at Minnesota, where for a long period he had been head of his department, and at the University of Minnesota Graduate School, Minneapolis-Rochester. He had been a member of the staff of the Glen Lake Sanatorium, Oak Terrace, University of Minnesota, Northwestern, St. Barnabas and the Abbott hospitals.

His many affiliations included service as consultant on audiometers and hearing aids of the Council on Physical Medicine of the American Medical Association and as president of the American Laryngological, Rhinological and Otological Society, American Acoustical Society, Minnesota Academy of Ophthalmology and Otolaryngology and the Minnesota Academy of Medicine, a fellow of the American College of Surgeons and a member of the committee on conservation of hearing of the Minnesota State Medical Association. For many years he was consulting otologist to the public schools in Minneapolis. Dr. Newhart was one of the first to be certified as a specialist by the American Board of Otolaryngology.

Exceedingly active in promoting the importance of testing the hearing of school children, Dr. Newhart had only recently completed with Scott N. Reger, Ph.D., a "Syllabus of Audiometric Procedures in the Administration of a Program for the Conservation of Hearing of School Children" while serving as a member of the executive committee of the committee on the conservation of hearing of the American Academy of Ophthalmology and Otolaryngology. In 1937 he was given honorable mention by the Minnesota State Medical Association for his exhibit on the prevention of deafness.

Henry Onslow Smith, Hudson, N. H.; Bellevue Hospital Medical College, New York, 1887; member of the American Medical Association, the New Hampshire Historical Society and the New England Historic Genealogical Society; served as president and for many years a member of the board of trustees of the New Hampshire Medical Society, from which he had received a fifty year medal in 1937; served as a member of the school board, trustee of the public library and member of the board of health; on the staff and trustee of the Memorial Hos-

CAPT. FREDERICK EMIL BARTHES
M. C., A. U. S., 1908-1944

CAPT. JAMES S. BERTOGLIO
M. C., A. U. S., 1917-1945

LIEUT. COMDR. JOHN W. FISH
(MC), U.S.N.R., 1908-1944

KILLED IN ACTION

Frederick Emil Barthes, La Grange Park, Ill.; Loyola University School of Medicine, Chicago, 1942; interned at the Columbus Hospital in Seattle; began active duty as a first lieutenant in the medical corps, Army of the United States, on Aug. 8, 1942; promoted to captain; killed in action in Belgium Dec. 18, 1944, aged 36.

James Stephen Bertoglio, Butte, Mont.; University of Michigan Medical School, Ann Arbor, 1943; interned at the City of Detroit Receiving Hospital; began active duty in the medical corps, Army of the United States, on Dec. 26, 1943; later promoted to captain; killed in action in Germany January 10, aged 27.

John Winston Fish, Louisville, Ky.; University of Louisville School of Medicine, 1934; member of the American Medical Association; on the staff and formerly an intern at the Kentucky Baptist Hospital; served a residency at the Eye, Ear, Nose and Throat Hospital in New Orleans, and the Methodist Episcopal Deaconess Hospital; on the staffs of the Norton Memorial Infirmary and the Jewish Hospital; commissioned a lieutenant in the medical corps of the U. S. Naval Reserve on Feb. 4, 1942; reported to Marine Corps Base, San Diego, Calif., for active duty; went to the Naval Air Station, Pensacola, Fla., for temporary duty in attendance on a course of instruction leading to the designation of aviation medical examiner; from there he went to Naval Reserve Air Base, Oakland, Calif., for duty with designation of "qualified medical examiner"; later ordered to Naval Air Station at Oakland for duty involving flying with designation of naval flight surgeon; ordered to report to an air group for duty involving flying on board a vessel; promoted to lieutenant commander on March 1, 1944; awarded the Asiatic-Pacific Area Campaign Medal and the Purple Heart; died in the Pacific area Nov. 25, 1944, aged 36, of blast concussion and bomb asphyxiation while on duty in the battle dressing station of an aircraft carrier.

pital and on the staff of St. Joseph's Hospital, both in Nashua; chairman of the local committee on public safety during World War I and chairman of the emergency medical service of civilian defense during World War II; in 1927 compiled and published "The Early Story of Hudson, N. H."; edited, amended and brought up to 1941 "The Story of the New Hampshire Medical Society"; died May 14, aged 80.

Grover C. Daniel, Whipple, Ariz.; Loyola University School of Medicine, Chicago, 1919; member of the Washington State Medical Association and the American Medical Association; served in the medical corps of the U. S. Army from September 1917 to December 1918; formerly assistant surgeon in the U. S. Public Health Service Reserve; manager of the Veterans Administration Facility; formerly manager and clinical director of the Veterans Administration Facility in Walla Walla, Wash.; at one time on the staff of the Veterans Administration Facility in West Los Angeles, where he died May 16, aged 53, of abdominal carcinomatosis.

Henry Houston Ogilvie ✠ San Antonio, Texas; University of Texas School of Medicine, Galveston, 1910; fellow of the American College of Surgeons; served during World War I; in July 1943 cited by the office of civilian defense in Washington for his service while chairman of the local emergency hospital corps; served as surgeon at the Santa Rosa, Nix, Medical Arts, Physicians and Surgeons and Medical and Surgical Memorial hospitals; consulting surgeon at the Robert B. Green Memorial Hospital; died in the Touro Infirmary, New Orleans, June 15, aged 60.

Herman Schwarz ✠ New York; Columbia University College of Physicians and Surgeons, New York, 1898; served on the faculty of his alma mater; specialist certified by the American Board of Pediatrics; member of the American Academy of Pediatrics; director of the department of pediatrics, serving as president of the medical board, Beth Israel Hospital; for many years associated with Mount Sinai Hospital, serving on the staff as consulting pediatrician at the time of his death; died in Bedford Village, N. Y., May 19, aged 69, of coronary thrombosis.

Eleanor Holden Balph ✠ Philadelphia; University of Pittsburgh School of Medicine, 1918; clinical assistant professor of gynecology at the Woman's Medical College of Pennsylvania; member of the Philadelphia Obstetrical Society; fellow of the American College of Surgeons; interned at the Hospital of the Woman's Medical College of Pennsylvania; chief of gynecology at the Woman's Hospital, where she died May 21, aged 57.

Annetta E. Barber, Glens Falls, N. Y.; Woman's Medical College of the New York Infirmary for Women and Children, New York, 1898; retired member of the Medical Society of the State of New York and member of the American Medical Association; died April 26, aged 86.

Foster Flavorial Burnett, Wilmington, N. C.; Howard University College of Medicine, Washington, D. C., 1917; served during World War I; an examining physician for city draft board number 1; a founder of the Community Hospital, where he died May 31, aged 54, of pulmonary embolism and chronic leukemia.

John William Patton, Cabool, Mo.; University of Maryland School of Medicine, Baltimore, 1886; served on the staffs of the North Dakota State Hospital for Insane, Jamestown, and the Toledo State Hospital in Toledo, Ohio; died March 17, aged 84, of ascites and cerebral hemorrhage.

James L. Prine, Day, Fla.; University of Georgia Medical Department, Augusta, 1900; died March 6, aged 71.

CAPT. TRUMBULL FRAZER
M. C., A. U. S., 1915-1945

LIEUT. WILLIAM H. MILLMANN
M. C., A. U. S., 1918-1945

LIEUT. (JG) ROBERT SMITH NICHOLS
(MC), U.S.N.R., 1920-1945

KILLED IN ACTION

Trumbull Frazer, Asheville, N. C.; Cornell University Medical College, New York, 1942; diplomate of the National Board of Medical Examiners; interned at the Rhode Island Hospital in Providence; served a residency at the Massachusetts Eye and Ear Infirmary in Boston and the Station Hospital, U. S. Army, Biggs Field, El Paso, Texas; began active duty as a first lieutenant in the medical corps, Army of the United States, on July 30, 1943; later promoted to captain; killed in action in Germany February 7, aged 29.

William Henry Millmann, Shorewood, Wis.; Marquette University School of Medicine, Milwaukee, 1943; interned at St. Mary's Hospital in Milwaukee; entered the medical corps of the Army of the United States as a first lieutenant on Oct. 18, 1943; began active duty on Aug. 4, 1944; killed in action in Italy February 21, aged 26.

Robert Smith Nichols, Hanover, N. H.; University of Pennsylvania School of Medicine, Philadelphia, 1943; diplomate of the National Board of Medical Examiners; interned at the Hospital of the University of Pennsylvania in Philadelphia; began active duty as a lieutenant (jg) in the medical corps, U. S. Naval Reserve, on Nov. 14, 1944; assigned to Navy Yard in Philadelphia; killed in action on Okinawa April 1, aged 24, while attempting to give aid to a wounded hospital corpsman.

Correspondence

MARIHUANA PROBLEMS

To the Editor:—In an editorial (THE JOURNAL, April 28, p. 1129) appears a criticism of a report on marihuana by the New York City Mayor's Committee on Marihuana.

The editorial states "Nevertheless, a book called 'Marihuana Problems' by the New York City Mayor's Committee on Marihuana submits an analysis by seventeen doctors of tests on 77 prisoners and, on this narrow and thoroughly unscientific foundation, draws sweeping and inadequate conclusions which minimize the harmfulness of marihuana."

The report was not an analysis by seventeen doctors of 77 prisoners. The Mayor's committee did not even consist of seventeen doctors of medicine; and if the writer of the editorial had read the report carefully he would have noted that only sixteen different names are given as comprising the Mayor's committee and that two of these are not M.D.'s. Nor were there 77 prisoners studied. Of the 77 persons studied 5 were volunteers, not prisoners. This is clearly stated in the text.

Any one reading the editorial would not realize that Mayor La Guardia "sought advice from the New York Academy of Medicine"; and, as he states in the foreword, "On the academy's recommendation I appointed a special committee to make a thorough sociological and scientific investigation and secured funds from three foundations with which to finance these studies." The New York Academy of Medicine kept in close touch and advised concerning the study throughout the entire period during which it was carried out.

The study was actually carried out as follows: Two subcommittees were appointed, one to plan a sociological study, the other to work out details of the clinical study. The sociological study was carried out under the active direction of Dr. Dudley D. Shoenfeld, using six police officers who had been specially trained as social investigators. The Police Department placed the services of the Narcotic Squad Division at the disposal of the Mayor's committee. Six members, four men and two women, carried out for a period of over one year a painstaking investigation of the use of marihuana in the city of New York.

The report states that in this period of over a year "while on duty, the squad actually lived in the environment in which marihuana smoking or peddling was suspected. They frequented poolrooms, bars and grills. . . . They consorted with habitués of these places. . . . They posed as suckers from out of town and as students in colleges and high schools." From this sociological study and not simply from tests of 77 (actually 72) prisoners, as stated in the editorial, thirteen conclusions were drawn, the following of which are quoted:

7. The practice of smoking marihuana does not lead to addiction in the medical sense of the word.
10. Marihuana is not the determining factor in the commission of major crimes.
13. The publicity concerning the catastrophic effects of marihuana smoking in New York City is unfounded.

The editorial states that "the report states that the relation between marihuana and crime is unfounded. This opinion, based on tests of 77 prisoners, denies much available evidence." Since, as has just been shown, the report describes conditions in New York City and concludes that there is no important relationship between marihuana and crime in that city, and since these conclusions are not based on "tests of 77 prisoners," it is apparent that the writer of the editorial has either not read the report carefully or is deliberately misrepresenting the facts.

Besides the sociological study, clinical studies including medical aspects, psychologic aspects and pharmacologic aspects are reported. The pharmacologic study takes up sixty-four pages of the report and includes much valuable material as to the active principle of marihuana and gives actual experimental work with animals. The psychologic studies, which were most carefully done, include the use of a large number of the standard types of tests and some of the newer technics, such as play technic.

The conclusions as written by Dr. Wallace, chairman of the committee, are that the first phase of the study, namely the sociological, indicates that "the marihuana user does not come from the hardened criminal class, and there was found no direct relationship between the commission of crimes of violence and marihuana." He then goes on to state that under the clinical study "in a limited number of the subjects there were alterations in behavior giving rise to antisocial expression. This was shown by unconventional acts not permitted in public, anxiety reactions, opposition and antagonism, and eroticism. Effects such as these would be considered conducive to acts of violence. However, any tendency toward violence was expressed verbally and not by physical actions, and in no case was restraint by force needed." These, then, were some of the conclusions drawn from the study of 72 confined criminals and 5 volunteers. They are not what one would assume to be the case in reading the editorial in THE JOURNAL.

The editorial then goes on, "Kolb, nationally known addiction expert, after reading the report stated 'one may say of such a drug that, if it were abused as alcohol is abused, it might be an important cause of crimes and other misdemeanors.'" The report of the Mayor's committee was published in the latter part of 1944. The quotation from Dr. Lawrence Kolb appears in the discussion of a paper read at the meeting of the American Psychiatric Association at Boston, May 18 to 21, 1942. At least one presumes that the quotation intended is the following: "It can readily be seen that a drug which produces all these effects, if used as widely as alcohol is used in this country, might be like alcohol a very important contributing cause to crimes of various kinds."

Kolb's discussion occupies a considerable part of a whole page, the quotation being from page 251 of volume 99, number 2, September 1942, of the *American Journal of Psychiatry*. One wonders why the writer of the editorial left out the following portion of Kolb's statement, which would certainly give the readers of THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION an entirely different idea of the dangers of marihuana than the partial and garbled quotation. I quote as follows: "In view of the misinformation and alarm that has gotten abroad about marihuana it is important to have a competent group like the Mayor's committee to study this drug and present the real facts. *In the meantime* [italics mine], Dr. Allentuck's timely paper will tend at least to get physicians' feet back on the ground. The case against marihuana has been very much overdrawn, but we learn from Dr. Allentuck that the drug does have intoxicating effects and that in susceptible people it may precipitate a psychosis. A drug which has these properties is, of course, dangerous. . . . The studies should be made if possible in a country such as Mexico where there is said to be a really widespread use of marihuana. It is of interest, however, that many physicians in Mexico feel that marihuana does little if any harm. It is reassuring to find from the careful study that Dr. Allentuck has made that the alarm about the relation of marihuana to crime is unfounded. The drug, like most other intoxicants, is taken mostly because it produces a sense of ease and finally sleep, but on its way to this final result there is a peculiar, bizarre type of intoxication with release of inhibitions."

The editorial further states that "the report proposes the use of marihuana in the treatment of drug addiction and chronic alcoholism. Bouquet, the League of Nations expert, and others agree with Kolb that this proposal enters dangerous territory and that the result can only be the substitution of one addiction for another." On page 218 of the Report of the Mayor's Committee, under "Summary," appears the following statement: "From limited observations on addicts undergoing morphine

withdrawal and on certain types of psychopathic disturbances, the impression was gained that marihuana had beneficial effects, but much more extensive and controlled study is required for definite conclusions to be drawn concerning therapeutic usage." Likewise, on page 148 under chapter "Possible Therapeutic Applications" it is also stated "However, the studies here described were not sufficiently complete to establish the value of such treatment, and before conclusions can be drawn the problem must be investigated under completely controlled conditions."

Do these sound like "sweeping and inadequate conclusions" on "narrow and thoroughly unscientific foundations"? Or does this not seem like the type of conclusions which careful, scientific observers give after a study which they feel does not warrant final conclusions?

There have been further studies made in New York City on the relationship of marihuana to crime, and the psychiatric examination of convicted prisoners at the Court of General Sessions and the studies of persons charged with crime made in the prison wards of the psychiatric division of Bellevue Hospital confirm that marihuana is not an important cause of crimes of violence in New York City.

The claim in the editorial that "the recent article which appeared in the December 1944 issue of *War Medicine* entitled 'The Marihuana Addict in the Army,' by Captain Eli Marcovitz and Captain Henry J. Myers, is a devastating refutation of the information contained in the La Guardia report" is hardly borne out by a careful study of the article. On page 4 it is stated that "marihuana addicts usually present an extremely complex picture in which the use of the drug is but one aspect." Under "Summary and Conclusions" on page 9 it states that, "as a group, their backgrounds were heavily loaded with adverse familial, social and economic factors. Their histories were characterized by delinquent and criminal behavior and failure to develop any consistent patterns of productive work." It is also stated "Our experience indicates that a confirmed marihuana addict of the type described here is a sick personality whose maladjustment has been determined not only by his own personality and character patterns but by adverse socioeconomic factors."

It is also pointed out in their study that "it must be emphasized that our conclusions are based on observations of a specialized group of marihuana addicts, namely a group in military service with difficulties which brought them to the attention of the military or medical authorities. Undoubtedly there are other types of marihuana users or even addicts (e. g., band musicians), observation of whom might lead to somewhat different conclusions."

Many persons fail to differentiate between cause and effect. Marihuana is often used by inadequate and maladjusted individuals who were this way long before they started the use of marihuana. It is also used by many unstable psychopaths, and acute psychotic episodes may be precipitated in these individuals by its use. The conclusion that they are maladjusted because of the use of marihuana is only a partial truth. The use of any narcotizing drug, as marihuana, alcohol or opium, contributes to further maladjustment, but the fundamental personality defect and the original maladjustment are the important problems and the marihuana is much more a symptom than a cause.

The report describes conditions in New York City, gives details of careful medical, psychiatric and psychologic tests on 5 volunteers and 72 prisoners and of special pharmacologic studies. As a result of the sociological studies certain conclusions were drawn about the use of marihuana and its relation to crime in New York City. From the other studies certain conclusions were drawn, and in certain instances it was pointed out that further studies were necessary before any decision could be made.

KARL M. BOWMAN, M.D., San Francisco.

BLOOD BANK OF QUEENS COUNTY, INC.

To the Editor:—Supplementing my communication in THE JOURNAL, May 19, I wish to call attention to the results obtained at the Mary Immaculate Hospital, adjacent to the Blood Bank of Queens County, as submitted to me by the obstetric department. Excepting one death from a brain tumor and one from pneumonia, there was not a maternal death for a period of one year. There were 1,736 deliveries. This was due in part to having blood of the proper type and Rh factor available at the moment the patient entered the delivery room.

When the obstetrician draws blood for a Wassermann test in the early stages of pregnancy he also determines the type and Rh factor of the patient and on admission to the hospital blood of her type and Rh factor is placed in an ice box adjacent to the delivery room in case of need. Blood of all types is easily kept through the cooperation of both doctor and hospital insisting that relatives or friends replace on a two for one basis. Persons paying for their hospitalization in 80 per cent of the cases have blood on deposit in advance. The uncooperative 20 per cent are asked to make a cash deposit equivalent to the cost of a professional donor. In our plan it is $35, which is returned to them on replacement.

Blood may be obtained at varying prices, as low as $15, but the replacements are so few, owing to the small deposit required, that it is necessary for suppliers to solicit random donors for a fee, usually $5. When the deposit is kept at the higher level, it is unnecessary to solicit donors and we always have more blood than we need, even for all the free cases, and no one is denied blood regardless of ability to pay or replace. Four out of five of the few who do put up the deposit come in during the ninety day period allowed for replacement and obtain their refund.

The identification card for blood donors as described in THE JOURNAL of May 19 has created great interest in mutual blood donor groups, especially among Rh negatives.

EDWARD J. MADDEN, Jamaica, N. Y.
Chairman, Blood Bank of Queens County.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

BOARDS OF MEDICAL EXAMINERS
BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of the boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, July 14, page 826.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral.* San Francisco, Oct. 15-17. *Written.* Various centers, Oct. 15. Final date for filing application is Aug. 1. Candidates in the armed forces may take the examination at their station with the permission of their medical commanding officer. Asst. Sec., Dr. W. A. Werrell, 1301 University Ave., Madison 5, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: Chicago, May 27. Final date for filing application is Jan. 31. Sec., Dr. P. C. Bucy, 912 S. Wood St., Chicago 12.

AMERICAN BOARD OF OPHTHALMOLOGY: Chicago, Oct. 4-6; and Los Angeles, January. Sec., Dr. S. Judd Beach, 56 Ivie Rd., Cape Cottage, Me.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Part I. Oral and Written.* New Orleans, Sept. 28-29, Philadelphia, Oct. 5-6, Chicago, Oct. 12-13 and San Francisco, Oct. 19-20. Final date for filing application is August 1. Sec., Dr. G. A. Caldwell, 3503 Prytania St., New Orleans 15.

AMERICAN BOARD OF OTOLARYNGOLOGY: Chicago, Oct. 3-6. Sec., Dr. Dean M. Lierle, University Hospital, Iowa City, Ia.

AMERICAN BOARD OF PEDIATRICS: *Written.* Locally, Oct. 19. *Oral.* New York, Dec. 7-8. Sec., Dr. C. A. Aldrich, 115½ First Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF RADIOLOGY: *Oral.* Fall, 1945. Final date for filing application is Aug. 1. Sec., Dr. B. R. Kirklin, Mayo Clinic, Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Written.* Various centers, October 24. Final date for filing application is Aug. 1. Sec., Dr. J. S. Rodman, 225 S. 15th St., Philadelphia 2.

AMERICAN BOARD OF UROLOGY: *Written.* Chicago, Dec. 9. *Oral.* Chicago, Feb. 19-22. Sec., Dr. Gilbert J. Thomas, 1409 Willow St., Minneapolis 4.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Requirement of Maine Nurses Registration Act That Applicant for Registration Be Graduate of Nursing School Presided over by Maine Registrant Valid.—The nurses registration act of Maine provides for the registration and certification of professional trained nurses and that a register of their names be open at all times to public scrutiny. The administration of the act is committed to a Board of Registration of Nurses. Registration is purely voluntary and in no way compulsory. Any nurse possessing the qualifications required in the act may submit to examination for registration. Nurses who are registered in other states are entitled to registration without examination. While the practice of professional nursing as a registered nurse without a certificate of registration is prohibited, the act expressly states that it does not apply to the nursing of the sick by any person who does not represent himself or herself to be a registered nurse. One section of the act authorizes the board to admit to examination for registration any applicant who possesses stated qualifications, among which is the completion of a course of not less than two years in a school of nursing approved by the board "and presided over by a nurse registered in accordance with the requirements" of the act. Irene Snelson, who apparently possessed all the qualifications required by the act except that she had not graduated from a school of nursing presided over by a nurse registered under the Maine act, sought to be examined for registration under the Maine act. The board refused to examine her and she subsequently sought a writ of mandamus for admission to examination for registration as a registered nurse, alleging that she was eligible for registration and that the refusal of the board to admit her to examination was illegal and a violation of her constitutional rights. In effect, there was a judgment in favor of Irene Snelson and the board appealed to the Supreme Judicial Court of Maine.

The purpose of the nurses registration act of Maine, said the court, relating to the registration and certification of registered nurses is not to regulate or control the practice of nursing as a calling but to designate by public registry and certification those nurses for whose qualifications the state is willing to vouch and to prevent others who are not entitled to it from claiming falsely such sponsorship. Under the act no applicant for registration and certification as a registered nurse can be admitted to examination unless he or she has complied with all the conditions there enumerated and one of those conditions is that the applicant for examination for registration shall have been trained in an approved school of nursing presided over by a nurse registered in Maine. This requirement applies alike to nursing schools in Maine and to nursing schools situated outside the state. The language of that provision is clear and unambiguous, and its operation cannot be limited or extended by reading into it a meaning at variance with its express terms. Regardless of the standing of the nursing school at which the applicant had studied or the reasons why the school had not been approved, the fact that it was neither approved nor presided over by the act in question compelled the board to refuse to admit her to examination. The board cannot be required by a mandamus to violate its duty and to disobey the law.

On the record before us it is unnecessary, continued the court, to pass on the contention that that portion of the act is unconstitutional that requires an applicant for admission to examination to have been trained in an approved school of nursing presided over by a nurse registered in Maine. That provision is an integral part of the nurses registration act, and if that provision is void the act in its entirety is a nullity and registration and certification of registered nurses by examination has no sanction in law and a right to registration would therefore not exist in the state. On a premise of the unconstitutionality of the act authorizing the registration and certification of registered nurses by examination a writ of mandamus could not be issued commanding the performance of an act by the board which it had no power to perform. The validity of a statute cannot be assailed if the benefits of that statute are invoked in the same proceeding.

The court accordingly held that the board acted properly in refusing to admit Irene Snelson to examination for registration as a registered nurse.—*Snelson v. Culton et al., Board of Registration of Nurses, 42 A. (2d) 505 (Maine, 1945).*

Bureau of Investigation

MISBRANDED PRODUCTS

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the Federal Security Agency

[EDITORIAL NOTE.—These Notices of Judgment are issued under the Food, Drug and Cosmetic Act, and in cases in which they refer to drugs and devices they are designated D. D. N. J. and foods, F. N. J. The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the date of shipment; (4) the composition; (5) the type of nostrum; (6) the reason for the charge of misbranding, and (7) the date of issuance of the Notice of Judgment.]

Delayed Menstruation Tablets and Herb Tea.—Bernard McBrady, trading as J. E. McBrady & Company, Chicago. Shipped July 28 and 29 and Dec. 12, 1941. Composition: Delayed Menstruation Tablets contained iron sulfate, extracts of plant drugs, including aloe, and an alkaloid-bearing drug, with oil of savin, and coating of red calcium carbonate; Herb Tea No. 104, chiefly a mixture of senna leaves, camomile, cascara sagrada, elder flowers, dill seed, caraway, American saffron, uva ursi, licorice root, peppermint and sassafras; Herb Tea No. 107, senna leaves and pods, uva ursi, camomile flowers, rosemary leaves, sage leaves, comfrey root, oak bark, sweet orange peel, unicorn root, condurango bark, peppermint leaves and gentian root; Herb Tea No. 109, essentially a mixture of senna leaves and pods, cinchona bark, sweet orange peel, comfrey root, red clover tops, sassafras bark and sarsaparilla root; Herb Tea No. 110, essentially senna pods, malva flowers, horehound, tansy herb, camomile flowers, comfrey root, cinchona bark, ruta herb and sage; Herb Tea No. 114, chiefly marshmallow root, coltsfoot leaves, licorice root, mullein leaves, broom tops and linden flowers; Herb Tea No. 124, essentially leaves of spearmint, uva ursi and witch hazel, with hops, camomile flowers, red oak bark and unidentified plant material. Delayed Menstruation Tablets misbranded because of false implication in the name and the label claim, "For Painful, Suppressed, Profuse or delayed by Colds." Herb Tea No. 104 misbranded because represented to prevent or correct indigestion, poor appetite, sluggishness and some other things, and to save health and prolong life. Herb Tea No. 107 misbranded because falsely represented in labeling as a cure or preventive of leucorrhea. Herb Tea No. 109 misbranded because label falsely represented it as efficacious for skin eruptions. Herb Tea No. 110 misbranded because of misleading label representation that it was effective in delayed menstruation. Herb Tea No. 114 misbranded because labeling represented product as an effective treatment for irritating cough, minor chest colds and pains. Herb Tea No. 124 misbranded because it was not a cure or effective treatment or preventive of sores and ulcers.—[*D. D. N. J., F. D. C. 887; May 1944.*]

Sill's Powder Treatment and Sill's Powder Foot Treatment.—Sills Company, Vinita, Okla. Shipped Feb. 17 and March 27, 1942. Composition of both products identical, consisting essentially of salicylic acid, small amounts of bismuth subcarbonate, ammonium alum, boric acid, and aspirin in a base of talc. Misbranded because falsely represented in labeling as an effective treatment for many foot and general skin disorders.—[*D. D. N. J., F. D. C. 892; May 1944.*]

VeDor No. 578 Injection.—Primrose R. Devore, trading as Drug Products Company, Columbus, Ohio. Shipped June 18 and Sept. 4, 1941. Composition: essentially small amounts of zinc sulfate and lead acetate in water. Misbranded because statement "Use in connection with Anti-Gon Internal No. 578" falsely implied that the product constituted part of a treatment for gonorrhea and that, when used in connection with the one named, it would be efficacious in treating that condition, whereas it had no value either alone or in conjunction with the other mixture in such treatment. Also misbranded in that label failed to give the common name of each active ingredient, inasmuch as zinc sulfate was not declared. Misbranded, further, because label did not bear an adequate statement of the quantity of the contents.—[*D. D. N. J., F. D. C. 884; May 1944.*]

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1935 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. Digestive Diseases, Fort Wayne, Ind.

12:151-186 (May) 1945

Acute Hepatitis: Clinical Observations in 63 Cases. N. W. Chaikin and S. O. Chlenoff.—p. 151.
Drugs in Treatment of Peptic Ulcer and Hypersecretion. R. Ehrmann. —p. 154.
*Appetite and Obesity. F. Hoelzel.—p. 156.
*Disturbances in Sugar Metabolism After Subtotal Gastrectomy. C. L. Glaessner.—p. 157.
Observations on Ascorbic Acid Level of Blood Plasma of Women Maintained on a Thiamine Deficient Diet. Anne Bourquin.—p. 162.
Effect of Concentration of Pepsin and Differential Susceptibility of Jejunal Segments in Experimental Jejunal Ulcers in Dog. R. L. Driver, R. H. Chappell and E. B. Carmichael.—p. 166.
Effect of Hydrostatic Pressure on Experimental Production of Ulcers. R. L. Driver, R. H. Chappell and E. B. Carmichael.—p. 168.
Increased Intra-Abdominal Pressure as Means of Inhibiting Perforations Due to Pepsin Solutions Under Hydrostatic Pressure in Small Intestine of Dogs. R. H. Chappell, R. L. Driver and E. B. Carmichael. —p. 169.
Pruritus Ani. G. R. McCutchan.—p. 171.
Effect of Epidemic Gastroenteritis on Enterozoic Parasites. R. L. Brown. —p. 174.
Relation of Respiratory Allergy to Unresolved Pneumonia. J. A. Turnbull.—p. 176.

Appetite and Obesity.—Hoelzel asserts that all normal rats will eat enough to become fat if enough palatable and highly nutritious food is available. Uninhibited, normal human beings will apparently do likewise. Apart from this, appetite is likely to become excessive when hydration becomes abnormally increased, either because of the type of diet used or because of the amount of food eaten or as a result of endocrine factors (as in menstrual edema and hydration associated with pregnancy) or after recovery from disease. Appetite can best be controlled by keeping hydration within normal bounds.

Sugar Metabolism After Subtotal Gastrectomy.—In 14 patients who had undergone subtotal gastrectomy, Glaessner found that even oral intake of 100 Gm. of glucose provoked characteristic attacks of hyperglycemic shock consisting of manifestations of nausea, vomiting, headache, cramps in the abdomen, coma and nystagmus. These attacks are probably caused by a sudden rise of blood sugar. Studies during hyperglycemic shock revealed disorders of the vascular system such as increase of the pulse rate and decrease of the systolic and especially of the diastolic blood pressure. In a few cases a comatose condition could be observed: disorientation and soft eyeballs.

American Journal of Diseases of Children, Chicago

69:203-266 (April) 1945

Blood Pressures in Children Between Ages of 5 and 16 Years. A. W. Graham, E. A. Hine Jr. and R. P. Gage.—p. 203.
*Initial Aerobic Flora of Newborn Infants: Selective Tolerance of Upper Respiratory Tract for Bacteria. J. C. Torrey and M. K. Reese. —p. 208.
*Treatment of Rate Bite Fevers with Penicillin. W. E. Wheeler.—p. 215.
Celiac Syndrome: II. Fecal Excretion in Congenital Pancreatic Deficiency at Various Ages and with Various Diets, with Discussion of Optimal Diet. D. H. Andersen.—p. 221.
Clinical Survey of 125 Cases of Infection with Ascaris Lumbricoides in Children. N. H. Einhorn, J. F. Miller and L. Whittier.—p. 237.

Flora of Upper Respiratory Tract of Newborn Infants.—Torrey and Reese made cultures of material from the throats and the noses of 105 full term infants during the first twenty-four hours after birth. No bacterial growth was obtained from swabbings of those regions taken within four hours after birth in 95 per cent of the group so studied. This result confirms the conclusion of a previous study that normally the initial flora of the nose and throat is acquired mainly from the environment after birth and not from the parturient canal. Cultures of material from infants 13 to 18 hours old indicated continued sterility of the nose in 31 per cent and of the throat in 4 per cent, but by the end of the first day the cultures of all infants examined yielded growth from both regions. White staphylococci, alpha or gamma streptococci and, less frequently, diphtheroids were the first organisms to invade the oral cavity. The upper respiratory tract during the first two weeks of life rarely becomes infected with the pneumococcus, the beta hemolytic streptococcus, Hemophilus influenzae and the Friedländer bacillus through contact with nursing mothers who are carriers of these organisms. Although occasionally the pneumococcus was cultured from the nasopharynx within a few days of birth, it soon disappeared from the secretions. The mucous membrane of this region of the newborn infant is unreceptive not only to these pathogens but to certain other bacterial types, such as Streptococcus salivarius, the gram-negative diplococci and the hemoglobinophilic Hemophilus hemolyticus, which thrive there later in life. If acquired, these organisms are also soon eliminated. Routine use of the conventional types of face masks by persons in contact with the infants is of little value in preventing the acquisition by the newborn infant of organisms of the respiratory tract, pathogenic or otherwise.

Penicillin Therapy of Rat Bite Fevers.—Twenty-five cases of rat bite were treated at the Children's Hospital of Michigan during 1944. One child died of pneumonia after extensive rat bites but without clinical signs characteristic of rat bite fever. Five others had rat bite fever. Spirillum moniliformis was isolated from the blood stream of 4 of these children and Spirillum minus from that of 1 child. One of the children with infection due to S. moniliformis died of diarrhea and jaundice after having had one dose of oxophenarsine hydrochloride. The remaining patients were treated with penicillin and had prompt and dramatic recovery. A dose of 5,000 units of penicillin given intramuscularly every two to three hours for a week to ten days seemed adequate to control both types of infection in these babies, who weighed from 5 to 12 pounds (2.3 to 5.4 Kg.). Wheeler has found that it has been possible to isolate and cultivate Streptobacillus moniliformis easily, using only the mediums and equipment which are routinely employed in the laboratories of most children's hospitals.

American Journal of Ophthalmology, Cincinnati

28:451-580 (May) 1945

Direct Utilization of Eye as Camera. W. A. Mann.—p. 451.
Use of Artificial Fever Therapy in Ophthalmology. I. C. Smith and G. C. Struble.—p. 461.
Some Observations on Divergent Strabismus with Anomalous Retinal Correspondence. H. W. Grant.—p. 472.
Amyloid Disease of Conjunctiva. N. B. Elles.—p. 486.
Clinical Effects of Local Use of Sulfonamides on Eyes. M. E. Alvaro. —p. 497.
Dacryocystitis: Part Played by Syphilis in Its Etiology. J. O. Wetzel. —p. 511.
Use of Scleral Resection in High Myopia: Report of Case. W. E. Borley and O. R. Tanner.—p. 517.
Penicillin Administered Locally in Gonorrheal Ophthalmia: Sensitization Reaction. E. A. Vorisek and A. L. Evans.—p. 520.

Am. J. Roentgenol. & Rad. Therapy, Springfield, Ill.

53:319-422 (April) 1945

Myelography by Use of Pantopaque in Diagnosis of Herniations of Intervertebral Disk. A. B. Soule Jr., S. W. Gross and J. G. Irving. —p. 319.
Arteriography for Demonstration of Intracranial Aneurysms. R. M. Lowman and S. D. Doff.—p. 341.
Diseases of Vertebral Column: Roentgenologic Analysis. A. Oppenheimer.—p. 348.
Importance of Examination of Sputum in Evaluating Parenchymal Infiltration. A. Rest.—p. 370.
Hemangioendothelioma of Diaphragm: Report of Fatal Case in Infant. W. K. Van Alstyne.—p. 373.
Results of Irradiation of Ovarian Tumors. H. D. Kerr and R. A. J. Einstein.—p. 376.
Roentgenologic Filing System Adapted from "Standard Nomenclature of Disease." O. H. Grunow.—p. 385.
Behavior of Thimble Chambers When Used for Measurement of Very Soft Radiation. J. A. Victoreen, Z. J. Atlee and E. D. Trout.—p. 391.

Annals of Allergy, Minneapolis

3:91-162 (March-April) 1945

Autonomic Nervous System in Relation to Allergy. A. Kuntz.—p. 91.
Dermatologic Manifestations of Familial Nonreaginic Allergy. A. F. Coca.—p. 101.
Agglutination of Pollen Antigen Coated Bacteria by Serums of Ragweed Sensitive Patients. B. B. Alperstein.—p. 110.
Military Aspects of Allergic Rhinitis. P. Blank and H. Levitt.—p. 113.
*Severe Light Hypersensitiveness Cured by Cholecystectomy. E. Urbach and H. Shay.—p. 124.

Hypersensitiveness to Light Cured by Cholecystectomy.—A woman aged 63 had a severe light dermatosis, which was cured by extirpation of the infected gallbladder. As in other cases of light hypersensitiveness, a pathologic intestinal flora was found. This may well have been the cause of the increased porphyrin content of the stool. Two possible mechanisms are suggested by Urbach and Shay through either of which the diseased gallbladder might have been responsible for the agent causing the hypersensitiveness to light.

Annals of Surgery, Philadelphia

121:545-768 (May) 1945

Current Considerations of War Surgery. M. E. DeBakey and N. Carter.—p. 545.
Remarks on Few Surgical Problems in Aviation Medicine. R. L. Clark Jr. and A. R. Shands Jr.—p. 564.
Emergency Surgical Plan in Army Air Force Hospital. H. J. Warthen Jr.—p. 573.
Analysis of Results of Surgical Treatment of 260 Consecutive Cases of Chronic Peptic Ulcer of Duodenum. W. F. Rienhoff Jr.—p. 583.
Transthoracic Gastrectomy for Unusual Lesions of the Stomach. R. A. Griswold.—p. 600.
Plan for Surgical Management of Gastrojejunocolic Fistula. S. F. Marshall.—p. 620.
*Full Thickness Skin Grafts from Neck for Function and Color in Eyelid and Face Repairs. J. B. Brown and B. Cannon.—p. 639.
Tattooing of Free Skin Grafts and Pedicle Flaps. L. T. Byars.—p. 644.
Tantalum Cranioplasty for War Wounds of Skull. B. Woodhall and R. G. Spurling.—p. 649.
Penicillin as Adjunct to Surgical Treatment of Acute and Chronic Empyemas. B. Blades.—p. 672.
Total Hysterectomy. H. L. Foss.—p. 680.
Surgical Principles Underlying Use of Grafts in Repair of Peripheral Nerve Injuries. L. Davis, G. Perret and W. Carroll.—p. 686.
Observations on Conversion of Normal into Malignant Cells. W. M. Firor and G. O. Gey.—p. 700.
Mucoid Disease of Appendix. G. H. Bunch.—p. 704.
Appendicitis: Possible Effects of Sulfonamides on Mortality. T. B. Aycock and E. M. Farris.—p. 710.
Sacral and Presacral Tumors. G. V. Brindley.—p. 721.
Treatment of Varicose Veins by Stripping, Excision and Evulsion. G. B. Hodge, K. S. Grimson and H. M. Schiebel.—p. 737.
Quadricepsplasty. T. C. Thompson.—p. 751.

Skin Grafts from Neck for Eyelid and Face Repairs.—Brown and Cannon say that full thickness grafts from the neck and the clavicular region have been found to give superior results in the repair of facial defects. The amount of skin available is limited, but there is enough for the eyelids, for the nose and about the mouth. The color is nearly always close to that of the normal face. None of these grafts so far have had to have pigment injection for color matching, whereas dead whiteness or darkness of other grafts often leaves much to be desired. The second advantage is softness and therefore function. These grafts heal and have such thickness that the best kinesis of grafted areas can develop. This property is best expressed in eyelid repairs, where hard, boardlike scars of gasoline and phosphorus burns have to be literally dug out of the lids and across from one eye to the other over the nose. When these areas are covered with the neck grafts there is often a dramatic relief of scar fixation and return of softness and function. The main areas for use are on the lids, in the canthal regions, about the ala, over the nose and about the lips and angles of the mouth. As a rule, flap repairs are considered for gunshot wounds, whereas grafts usually suffice for burns. However, about the lids, if a bed at all suitable can be obtained by dissection of the scars, these full thickness grafts are used in preference to flaps and, it is thought, with better results. Donor sites can be closed, left open to granulate or grafted. They may make troublesome scars for a while, but no permanent severe trouble has been seen.

Archives of Dermatology and Syphilology, Chicago

51:229-294 (April) 1945

Ulcerative Hodgkin's Disease and Lymph Node Imprints. S. E. Sweitzer and L. H. Winer.—p. 229.
Experimental Prophylaxis of Chancroid. F. C. Combes and O. Canizares.—p. 237.
Treatment of Dermatitis Herpetiformis with Penicillin. C. C. Carpenter and W. H. Hall Jr.—p. 241.
Ulcerative Diphtheria of Skin, Desert Sore and Tropical Ulcer: Report of Epidemic Observed in Haifa, Palestine. S. Gill.—p. 243.
Psychosomatic Studies in Dermatology: A. Motivation of Self-Induced Eruptions. H. E. Michelson.—p. 245.
Id.: B. Psychobiologic Studies of Patients with Atopic Eczema (Disseminated Neurodermatitis). F. W. Lynch, R. G. Hinckley and D. W. Cown.—p. 251.
Papular Sporotrichosis. O. G. Costa and M. A. Junqueira.—p. 261.
Herpes Zoster Generalisatus Associated with Chronic Lymphatic Leukemia. R. L. Barton and P. A. O'Leary.—p. 263.
Nutritional Survey of 354 Dermatologic Patients. J. L. Callaway, D. F. Milan and R. O. Noojin.—p. 266.

Archives of Surgery, Chicago

50:177-222 (April) 1945

*Prophylaxis of Wound Infection: Studies with Particular Reference to Soaps and Irrigation. L. W. Peterson.—p. 177.
Osseous, Cartilaginous and Mixed Tumors of Human Breast: Review of Literature. A. Rottino and Kathleen Willson.—p. 184.
Metabolic Alterations Following Thermal Burns: III. Effect of Variations in Food Intake on Nitrogen Balance of Burned Patients. J. W. Hirshfeld, W. E. Abbott, M. A. Pilling and others.—p. 194.
Influence of Environmental Temperature on Shock. H. C. Bergman and M. Prinzmetal.—p. 201.
*Blood Iodine Studies: VI. Analysis of Blood Iodine in Thyroid Disease. G. M. Curtis and M. B. Fertman.—p. 207.
Early and Late Postoperative Ambulation: Comparative Study of 303 Cases. V. D'Ingianni.—p. 214.
Topical Use of Concentrated Penicillin in Surface Active Solution. E. J. Grace and V. Bryson.—p. 219.

Prophylaxis of Wound Infection.—A series of experiments performed by Peterson on animals indicated the efficacy of the various soaps as germicidal agents. When the soaps were placed in actual contact with the uncontaminated fresh wounds they produced a definite but slight irritation. This was noted only on microscopic examination; gross examination revealed no difference between control wounds and wounds into which soap had been placed. In wounds which were contaminated by placing a given amount of a culture of Staphylococcus aureus within their depths and then exposed to soap there was a definite increase in signs of infection over those found in the control wounds not exposed to soap; "green" soap was found more irritating than "white" soap. The harmful effect of mechanical washing of wounds is in direct proportion to the coarseness of the material used. Of the various methods studied the cleansing of contaminated wounds by a gentle irrigation with isotonic solution of sodium chloride is the most effective prophylaxis of wound infection. Contaminated wounds treated with this gentle irrigation healed with less evidence of infection than did control contaminated wounds subjected to no treatment other than closure at the specified time. Best results in cleansing small wounds were obtained by irrigating them with 1,000 cc. of saline solution with no scrubbing, utilizing the force of the stream as the washing mechanism.

Blood Iodine.—Curtis and Fertman made a comparative analysis of the blood iodine, basal metabolic rate and certain other factors in 138 different clinical conditions in a total of 818 persons. In the years between 1932 and 1936 they determined the blood iodine by the dry ash technic, from 1936 to date by the chromium trioxide method. The average blood iodine level was found to be significantly elevated in all forms of toxic goiter. Associated with the increase in the blood iodine there occurred an elevated average basal metabolic rate. In no two groups of toxic goiter, including the exophthalmic variety, was there found by statistical test any significant difference between the average blood iodine concentrations. Some difference in the nature or quantity of the whole or fractionated blood iodine might be expected in exophthalmic goiter and should be further investigated. The blood iodine may rise as high in toxic nodular goiter as in exophthalmic goiter. The average blood iodine level was not significantly elevated in nontoxic nodular goiter and in nontoxic diffuse colloid goiter. The average basal metabolic rate was significantly increased in nontoxic nodular goiter but averaged only minus 7 per cent

in diffuse nontoxic colloid goiter. The average blood iodine in 79 patients with hypothyroidism was not significantly lower than that in normal persons from this goitrous region, although the average basal metabolic rate was reduced. The average blood iodine in 9 patients with carcinoma of the thyroid, unlike that of a previous group of 3 similar patients, did not differ significantly from the normal in spite of an elevated basal metabolic rate. There was no significant correlation between the blood iodine level and the duration of the symptoms due to the carcinoma or to those of goiter when such was recorded. It would appear that the level of the blood iodine in carcinoma of the thyroid is more dependent on the nature of the thyroid gland in which the malignant growth occurs than on the malignant growth itself. In none of the thyroid disorders investigated was there any significant linear correlation between the level of the blood iodine and the duration of symptoms or of goiter. That some association may exist was indicated by a significant positive multiple correlation coefficient of the blood iodine in relation to the basal metabolic rate and the duration of toxic symptoms in hyperthyroidism or of goiter in nontoxic nodular goiter. This relationship shows that the blood iodine increases rather than decreases with some combination of the other two factors. In 3 patients with chronic thyroiditis the average blood iodine was not significantly elevated.

Bull. of the U. S. Army Med. Dept., Washington, D. C.

88:1-122 (May) 1945

Suggestions to Improve Early Treatment of Hand Injuries. S. Bunnell. —p. 78.
Invasion Eye Injuries. J. W. Clark.—p. 83.
Fractures of Femur. W. R. Hochwalt, S. C. Rogers and A. E. Culmer Jr.—p. 86.
Clearing Company for Gastrointestinal Disease? J. A. Halsted.—p. 90.
Scrub Typhus from Epidemiologic Viewpoint. J. F. Morehead.—p. 95.
Control of Sandflies with DDT. M. Hertig and R. A. Fisher.—p. 97.
Dentistry in Japanese Armed Forces. C. H. Harrill.—p. 102.
Roentgenographic Method for Localization of Foreign Bodies. J. J. Moore and W. M. Loehr.—p. 104.
*Reactions to Typhus Vaccine. V. E. Roth.—p. 111.
Technic for Staining Malaria Smears. D. A. Boroff and R. W. Gronemyer.—p. 113.

Reactions to Typhus Vaccine.—Roth states that constitutional or allergic reactions may occur following injections of typhus vaccine. Four of 9 patients with allergic reactions gave a history of egg allergy. Available evidence indicates that allergic reactions are caused by some residual egg allergen in the vaccine. To avoid serious and possibly fatal reactions, precautions should be the same as those taken before injecting horse serum products.

Connecticut State Medical Journal, Hartford

9:331-412 (May) 1945

Fundamental Concepts in Diagnosis and Treatment of Early and Limited Tuberculosis. J. H. Amberson.—p. 333.
Meeting Community Responsibility for Control of Tuberculosis. J. G. Stone.—p. 342.
Doctor and Group Insurance. H. S. D. Carlos.—p. 344.
Value of Cardiograms as Aid to Early Diagnosis in Suspected Cardiovascular Emergencies. C. F. Yeager.—p. 349.
Choline and Inositol Therapy of Cirrhosis of Liver. M. R. Goldstein and P. D. Rosahn.—p. 351.
Social Implications of Scientific Research. J. R. Williams.—p. 357.

Delaware State Medical Journal, Wilmington

17:59-80 (April) 1945

Employment Examination for Psychiatric Casualties. F. W. Dershimer. —p. 59.
Caudal Analgesia in Obstetrics. N. W. Vaux.—p. 68.
Carcinoma of Bartholin's Gland. J. F. Hynes.—p. 70.
Aspiration Biopsy of Kidney Region. D. M. Gay.—p. 71.

Journal of Clinical Endocrinology, Springfield, Ill.

5:119-162 (March) 1945

Hypopituitarism Associated with Epilepsy Following Head Injury: Report of 2 Cases. J. Lerman and J. H. Means.—p. 119.
Treatment of Menstrual Disorders with Prolactin. M. A. Goldzieher. —p. 132.
Studies on Pigmentation of Endocrine Origin. M. E. Davis, M. W. Boynton, J. H. Ferguson and S. Rothman.—p. 138.
Clinical Observations on Case of Idiopathic Tetany and Epilepsy. M. Taubenhaus and H. M. Engle.—p. 147.
Clinical Evaluation of Insulin. J. R. Williams.—p. 151.

Journal of Neurosurgery, Springfield, Ill.

2:181-256 (May) 1945

Ventriculographic Diagnosis of Cysticercosis of Posterior Fossa. R. Arana and A. Asenjo.—p. 181.
Cyst of Sixth Ventricle (Cavum of Verga): Successful Removal Through Transventricular Approach, with Notes on Embryology and Histopathology. M. Scott.—p. 191.
*Peripheral Nerve Injury in Fractures and Dislocations of Long Bones. E. S. Gurdjian and H. M. Smathers.—p. 202.
Pantopaque Myelography: Results, Comparison of Contrast Mediums and Spinal Fluid Reaction. W. G. Peacher and R. C. L. Robertson. —p. 220.
Subependymoma: Newly Recognized Tumor of Subependymal Derivation. I. M. Scheinker.—p. 232.
Method for Control of Carotid Cerebral Circulation During Operation. W. B. Hamby.—p. 241.
Arnold-Chiari Deformity in Adult Without Obvious Cause. P. C. Bucy and B. W. Lichtenstein.—p. 245.
*Phantom Limb Syndrome: Discussion of Role of Major Peripheral Nerve Neuromas. K. E. Livingston.—p. 251.

Peripheral Nerve Injury After Fractures.—The 53 nerve injuries for which Gurdjian and Smathers performed operations included 32 radial, 9 ulnar, 3 median, 8 peroneal and 1 sciatic nerve. The work was done mainly at the Receiving and Grace hospitals in Detroit. Early exploration in cases of nerve lesion associated with fracture of long bones is justifiable after complete study of the history, physical findings and x-ray films. If, from an orthopedic standpoint, open reduction is a procedure of choice, the involved nerve can be explored at the same time. Early exploration in ulnar nerve palsy associated with fracture of the medial condyle of the humerus is preferable. Anterior transposition of the nerve may then be carried out. Early exploration of primary peroneal palsy is desirable in injuries of the knee joint with fracture of the upper end of the fibula. There is a great likelihood of a torn nerve in most cases of primary peroneal palsy with fracture of the upper end of the fibula. In fractures of the middle third of the humerus complicated with radial palsy, exploration in eight to ten weeks is justifiable if there are no evidences of returning function. In compound fractures associated with nerve lesions early repair is feasible, particularly with present day chemotherapeutic measures. A nerve should be explored if there is no evidence of regeneration three to four months after a fracture of the neighboring bone.

Phantom Limb Syndrome.—Forty-two patients with a total of 50 major extremity amputations were studied in detail. Of the 50 amputations only 1 was never associated with phantom limb symptoms. The phantom limb is not a total reproduction of the amputated extremity. In upper extremity amputations the fingers are most prominent. The palm is less frequently felt, and the wrist and dorsum of the hand are usually not present. The forearm and upper arm are rarely perceived. Many patients give the impression that they feel "the whole thing," but on careful questioning it is evident that the posture and presence of much of the phantom limb are inferred often from small portions of the hand or fingers of which the patient has specific impressions. In lower extremity amputations similar phantom patterning is found. In neither extremity does the pattern correspond to the major peripheral nerve distributions. A majority of these patients felt that their phantom limbs had been clearly established immediately or very soon after amputation. The neuroma is not established early enough to be the determining factor in these initial symptoms. In 14 of these patients with 20 amputated limbs a total of 30 major nerve neuromas were accessible. On vigorous palpation of the neuroma, most of the patients described their sensation as like "striking your funny-bone." In no case did stimulation of the neuroma excite or simulate typical phantom sensations. Livingston thinks that the high incidence of phantom limb impression following amputation, its early appearance and its stability suggest a central rather than a peripheral denominator for these symptoms. The occurrence and persistence of severe phantom limb pain in a comparatively small proportion of the patients with phantom limb symptoms suggest an irritative disturbance that is superimposed on the underlying phantom limb mechanism. Evidence from these observations and from clinical experience suggests that the major peripheral nerve neuroma is rarely the "key" factor in this irritative process.

Northwest Medicine, Seattle

44:139-170 (May) 1945

Lupus Erythematosus Disseminatus: Two Cases, with Special Reference to Serology. R. P. Pillow and L. J. Palmer.—p. 142.
Brucellosis: Is It Public Health Menace? M. J. Goodman.—p. 145.
Practical Pentothal Anesthesia. A. C. Miller.—p. 147.
Guillain-Barré Syndrome: Report of Case with Death. N. K. Rickles. —p. 148.
Diagnosis and Evaluation of Activity in Tuberculosis. F. Slyfield. —p. 149.
Roentgenographic Features of Pulmonary Tuberculosis. E. W. Roberts. —p. 151.
Indications for Hysterectomy. A. F. Lee.—p. 154.
Treatment of Recurrent Boils. T. W. Houk.—p. 158.

Pennsylvania Medical Journal, Harrisburg

48:753-880 (May) 1945

Some Misconceptions and Abuses in Gynecologic Organotherapy. E. Novak.—p. 771.
Clinical Endocrinology. E. H. Rynearson.—p. 775.
Male Hormone Therapy. C. W. Dunn.—p. 780.
Convalescent Care and Postoperative Management: General Principles of Convalescent Care. H. T. Kelly.—p. 792.
Lung Abscess and Its Treatment. C. P. Bailey.—p. 799.
Medicine in Wartime Britain. H. A. Clegg.—p. 806.
Cancer of Larynx: Modern Diagnosis and Treatment. G. Tucker. —p. 809.
Enterozoic Parasitism in Infants. R. L. Brown.—p. 812.

Psychosomatic Medicine, Baltimore

7:135-194 (May) 1945

Incidence of Psychosomatic Affections in Britain. J. L. Halliday. —p. 135.
Therapeutic Role of Drugs in Process of Repression, Dissociation and Synthesis. L. S. Kubie.—p. 147.
Effect of Suggestion in Treatment of Vasospastic Disorders of Extremities. M. Lipkin, Ellen McDevitt, M. S. Schwartz and A. W. Duryee. —p. 152.
Psychophysiologic Relations in Cases with Head Injuries. J. Ruesch. —p. 158.

Surgery, Gynecology and Obstetrics, Chicago

80:449-560 (May) 1945

*Nutrition of Patients with Thermal Burns. S. M. Levenson, C. S. Davidson, C. C. Lund and F. H. L. Taylor.—p. 449.
*Absorbable Oxidized Cellulose with Thrombin as Hemostatic Agent in Surgical Procedures. A. Uihlein, O. T. Clagett, O. E. Osterberg and W. A. Bennett.—p. 470.
Clinical Appraisal of Cetylpyridinium Chloride as Skin Antiseptic. J. A. Helmsworth and P. I. Hoxworth.—p. 473.
Treatment of Postoperative Infections Following Internal Fixation for Fracture of Neck of Femur. K. Speed.—p. 479.
Hydronephrosis: Classification and Plastic Repair of Ureteropelvic Obstructions. T. E. Gibson.—p. 485.
Sickle Flap for Nasal Reconstruction. G. B. New.—p. 497.
Tumors of Subcutaneous Tissue and Fascia, with Special Reference to Fibrosarcoma: Clinical Study. D. A. Wilson.—p. 500.
Arterial Embolism: Simplified Technic for Removal of Saddle Embolus at Bifurcation of Aorta, with Report of Successful Case. R. R. Linton.—p. 509.
*Further Studies on Diagnosis of Bone Tumors by Aspiration Biopsy. Ruth E. Snyder and B. L. Coley.—p. 517.
Intravenous Alcohol in Surgical Patient: Preliminary Report. D. C. Moore and Mary Karp.—p. 523.
Influence of Thyroidectomy on Prominence of Eyes in Guinea Pig and in Man. B. M. Dobyns.—p. 526.
Total Gastrectomy: Report of 8 Cases. T. E. Jones and R. W. Kehm. —p. 534.
Total Abdominal Hysterectomy and "Occasional Operator." E. A. Gaston. —p. 539.
Carcinoma of Colon: Producing Acute Intestinal Obstruction During Pregnancy. W. F. Finn and J. W. Lord Jr.—p. 545.
Defect on Anterior Mediastinum: Successful Surgical Repair. R. E. Gross and J. E. Lewis Jr.—p. 549.

Nutrition of Patients with Thermal Burns.—Levenson and his associates say that with the increased use of plasma and the reemphasis of the proper use of electrolyte solutions many of the severely burned patients who formerly died of circulatory collapse are being brought through the early shock phase into the later period frequently characterized by nutritional disturbances. Thus the problem of malnutrition following thermal injury must now be faced in an increasing number of patients. The authors report 32 cases in which an effort was made to determine the protein and caloric requirements. The nutritional disturbances and especially the increased demand for protein was found to be directly related to the extent of the third degree burn. High caloric, high vitamin diets with up to 400 Gm. of protein per day were necessary in some cases. When this quantity of food could not be taken or tolerated, gavage and intravenous supplements were given. In cases in which nutritional requirements were not met, malnutrition developed, skin grafting and healing were delayed and, frequently, death ensued.

Absorbable Oxidized Cellulose with Thrombin as Hemostatic Agent.—Absorbable oxidized cellulose is prepared in the form of a transparent gauzelike material and a heavier material that resembles absorbent cotton. The material placed in individual sterile envelops cannot be reautoclaved, since it disintegrates. It may be boiled three minutes or kept in 70 per cent alcohol until used. The manufacturer also supplies concentrated dried thrombin in ampules containing either 5,000 or 10,000 units. The thrombin should be dissolved in no more than 5 cc. of a sterile saline solution. Absorbable oxidized cellulose, either gauzelike or cottonlike in type, with a solution of thrombin, was tried by surgeons of the Mayo Clinic as an aid to hemostasis in 60 cases. Results were encouraging; hemostasis was excellent and immediate in 37 cases and satisfactory in 20 cases. The hemostatic effect of oxidized cellulose seems to depend on its sticky character when saturated with blood. It produces minimum tissue reaction and is relatively nonirritating and readily absorbable. It can be removed from a wound without the secondary bleeding that so frequently occurs after removal of ordinary gauze. Since cellulose is a foreign body, however, use of a large amount of it in a deep, nondrained wound may be unwise. In pathologic studies no fibers were found remaining in the tissues four and one-half days after the material had been introduced into the wound.

Diagnosis of Bone Tumors by Aspiration Biopsy.—Snyder and Coley survey 567 bone aspirations done on 474 patients during the last twelve years. There have been no immediate complications of the procedure and no evidence to suggest more rapid development of metastasis. In primary bone tumors and metastatic carcinoma of bone, aspiration has been done in 385 cases, of which 67.5 per cent were definitely and specifically diagnostic, while a total of 82 per cent showed material sufficient for the diagnosis of tumor, the exact type diagnosis not being called in 14.5 per cent. In only 1 instance was a diagnosis of malignant tumor made when the resected specimen showed a benign tumor and in this case the treatment was local resection. Thus in no case did a false aspiration diagnosis lead to amputation for a benign process. The clinician must understand the scope and limitations of the method and realize that failure to obtain cells means only that no tissue was obtained, further interpretation depending on the clinical and roentgenographic findings. Aspiration biopsy has proved itself to be a valuable and reliable diagnostic procedure.

Texas State Journal of Medicine, Fort Worth

41:1-64 (May) 1945

Care of Premature Infant from an Obstetric Standpoint. R. A. Johnston.—p. 5.
Lobectomy and Pneumonectomy for Pulmonary Tuberculosis. A. O. Singleton and M. D. Knight.—p. 10.
Carcinoma of Vulva. O. W. English and E. L. Hunt.—p. 16.
Diverticulitis of Colon. J. G. Kerr.—p. 18.
Facts That Should Be Known About Allergy. J. H. Black.—p. 21.
Feeding Trends in Pediatrics. P. E. Luecke.—p. 24.
Use of Barbiturates in Obstetrics. R. L. Grogan.—p. 28.
Intraocular Melanoma: Case Reports. C. P. Schenck.—p. 31.
Practical Public Health Procedures in Control of Some of More Common Communicable Diseases. E. W. Prothro.—p. 35.
Malignant Epithelial Tumors in Young Age Groups. A. J. Gill and C. T. Ashworth.—p. 39.

Yale Journal of Biology and Medicine, New Haven

17:583-684 (May) 1945

Oral Manifestations of Certain Systemic Disorders. M. Heinemann and B. G. Anderson.—p. 583.
Influence of pH on Growth Factor Requirements of Bacteria. D. R. Doede.—p. 595.
Attitudes of Medical Students Toward Psychiatry. E. Kahn, F. C. Redlich and Margaret Keller.—p. 611.
Health Services for Hospital Personnel: III. Physical and Professional Organization and Operation of Personnel Health Service. A. J. Geiger and M. Calabresi.—p. 635.
Problems in Comparative Study of Brain Waves. T. H. Bullock. —p. 657.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Lancet, London

1:423-454 (April 7) 1945

Wynds of Glasgow: Hundred Years of Property or Life. T. Garland. —p. 423.
*Pulmonary Concussion ("Blast") in Nonthoracic Battle Wounds. O. Savage.—p. 424.
Primary Tuberculous Infection in Sanatorium Staff: Investigation and Supervision. P. W. Edwards, A. C. Penman, with Radiologic Interpretations by L. G. Blair.—p. 429.
Biosynthesis of "Nicotinamide" in Human Gut. P. Ellinger and R. Benesch, with addendum by W. W. Kay.—p. 432.
Postoperative Cutaneous Gangrene: Effect of Penicillin. C. Grimshaw and L. Stent.—p. 434.
Psychopathic Reactions in Liberated Countries. A. M. Meerloo.—p. 443.

Pulmonary Concussion in Nonthoracic Battle Wounds.—Savage performed complete necropsies on 87 battle casualties who had died mostly of various types of head wounds, spinal wounds, burns and the like. In 30 of these there were lung changes which were considered to be due to blast. In the earlier cases there was no evidence before death that the lungs were affected, but later in the series, when routine chest x-ray films were taken in patients who might have been exposed to blast, the typical radiologic changes were sometimes found. The time between wounding and death varied from under an hour to eighty-three days. The surfaces of the lungs generally showed no change, but when sectioned a striking "spatter" of hemorrhages was seen. In some, these had coalesced to form areas of consolidation. To obtain a record of the distribution of the hemorrhages, many of these lungs were reinflated at necropsy and x-rayed. Two types of picture were seen: (1) scattered opacities, sometimes confined to one lobe, and (2) the same scattered opacities, but in parts with hemorrhages so numerous that an appearance of consolidation was given. Evidence of blast hemorrhage elsewhere in the body was seen ten times. The liver was found bruised in 6 patients. Hemorrhages on the surface of the heart were seen four times. Small areas of hemorrhage were seen in the pancreas, spleen and colon, each on 1 occasion. In 23 of the 30 cases showing lung hemorrhages it was certain that they had been exposed to blast; in the remaining 7 the method of wounding was unknown.

Chinese Medical Journal, Washington, D. C.

62:111-220 (April-June) 1944

*Use of Placental Globulin Extract in Measles Contact: Attempt to Standardize the Dosage. F. T. Chu and S. C. Liu.—p. 111.
Studies on Murine Origin of Typhus Epidemics in North China: 3. Isolation of Murine Typhus Rickettsia from Rats, Rat Fleas and Body Lice of Patients During an Epidemic in a Poorhouse. W. T. Liu.—p. 119.
Riboflavin Deficiency Among Chinese: 3. Urinary Excretion of Riboflavin. H. C. Hou and M. Y. Dju.—p. 140.
Id.: 4. Glossitis. H. C. Hou.—p. 152.
Disease Incidence, Absenteeism and Medical Expenses of Public Utility Company in Shanghai. T. Kang.—p. 166.
Methods of Treating Opium Addiction. H. W. H. McClelland.—p. 176.
Present Status of Studies on Chinese Antimalarial Drugs. C. S. Jang. —p. 185.
Experimental Studies on Living Plague Vaccines. L. T. Hsue.—p. 193.
Case of Abdominal Pregnancy. N. Bercovitz.—p. 197.
*Congenital Malaria: Report of Case. K. T. Chen, I. L. Tang and M. C. Wang.—p. 199.

Placental Globulin Extract for Measles.—According to Chu and Liu a dry form of placental globulin extract may be prepared by means of methyl alcohol precipitation. It has the advantage over the usual wet product, as prepared by ammonium sulfate precipitation, in that it is convenient for pooling and storage without deterioration. When the dry product is redissolved and sterilized by the addition of merthiolate, it is ready for intramuscular injection for measles prophylaxis. The protein content of the solution should be determined for the calculation of doses. Ninety children who had been exposed to measles in families and orphanages were passively immunized by this placental extract. Either modification or prevention of the disease could be accomplished. Mild and general reactions were observed in 54 and 33 cases respectively. An attempt was made to standardize the dosage. It was found that the range of doses effective for modification was overlapped on the one hand by the range for complete prevention and on the other hand by that producing no effect at all. A dose of 25 to 30 mg. per kilogram of body weight for the fourth to sixth day of exposure or of 40 to 45 mg. per kilogram for the seventh to ninth day is very likely to result in the modification of the disease. Complete protection can be expected if a dose of more than 40 mg. per kilogram is used in the early incubation period.

Congenital Malaria.—According to Chen and his associates it has been amply proved that malaria can be transmitted through the placenta. They give a tabulated report of 39 cases which they collected from the literature and also present an observation of their own concerning a male infant whose mother had an attack of chills and fever when labor pains began. Two days later she had another bout of chills and fever, and tertian malarial parasites were found in the blood. On examination of the infant about seven weeks after birth the mother stated that he had been pale and losing weight since birth and that he had nursed poorly during the week prior to admission. The blood was found to have a hemoglobin content of only 10 per cent and an erythrocyte count of 1,060,000. Gametocytes of tertian malaria were found in the peripheral blood. It is believed that this is a case of congenital malaria. The history is suggestive. The mother had repeated attacks of malaria throughout the period of gestation and finally the infant was delivered during one such attack. The extreme degree of anemia cannot be explained on any other basis. The enlarged liver and spleen are presumably due to malaria. Finally the finding of the tertian malarial parasites in the peripheral blood is diagnostic and conclusive. The child responded splendidly to blood transfusion. Unfortunately an infection of the meninges interrupted the course of illness. Quinine was given but there was not enough time to determine its effect before the patient succumbed to the complication. The time of year, December-January, makes a postnatal infection unlikely.

Münchener medizinische Wochenschrift, Munich

91:297-322 (June 16) 1944. **Partial Index**

Neurotic Diseases as Allergic Reactions in Soldiers. E. Hofmann. —p. 297.
Principles and Experiences with Regard to Injuries Suffered in Military Service: Degrees of Brain Injuries. F. Schmieder.—p. 300.
Growth of Living Tissue Outside of the Organism Under Artificial Conditions. K. F. Bauer.—p. 303.
Diagnosis and Therapy of Acute Diseases of Throat. E. Reye.—p. 307.
New Findings with Regard to Evaluation of Electrocardiogram and Dangers of Overevaluation. Bauke.—p. 309.
Syphilis and Its Provocation. E. M. Müller.—p. 312.
*Hereditary Damage by Roentgen Rays. K. A. Fick.—p. 312.

Hereditary Damage by Roentgen Rays.—Fick's patient was a woman aged 28 with peritoneal tuberculosis. The family history of the woman as well as that of her husband did not reveal any hereditary disease. Four applications of roentgen rays with a total dosage of 350 roentgens were applied to the hypogastrium of the patient. This treatment was erroneously considered responsible for the amenorrhea occurring after the first application, being revealed only later as pregnancy amenorrhea. A premature boy was born with microcephaly, club foot, dislocation of the hip joint, microphthalmia and peromelia of the hands. A phenotypic girl was born two years after the application of the roentgen rays to her mother. Within another year a second boy with peromelia was born. The infant presented stump formation in the upper third of the forearm in the absence of the distal part of the forearm and of the hand. The application of a large dose of roentgen rays to the ovary of the mother during the first five weeks of pregnancy, i. e. during the period in which the fetus is most susceptible to rays, and the presence of microcephaly and microphthalmia frequently described by other authors as characteristic of hereditary damage by rays, strongly suggest that the roentgen therapy applied to the mother was responsible for the malformation of the first child. Animal experiments demonstrated that larger doses of roentgen rays may cause mutation in the first filial generation of mice. The conical hypoplasia of the forearm stump of the second boy with peromelia and the absence of any cicatrization makes it likely that the roentgen rays rather than amniotic adhesions were responsible for the malformation of the arm.

Book Notices

Medical Gynecology. By James C. Janney, M.D., F.A.C.S., Assistant Professor of Gynecology, Boston University School of Medicine, Boston. Cloth. Price, $5. Pp. 389, with 97 illustrations. Philadelphia & London: W. B. Saunders Company, 1945.

The presentation is straightforward and consistent and is illustrated with many drawings and reproductions, some of which are taken from standard textbooks. Considerable space is given to pelvic examination and history taking. The symptoms are considered appropriately by headings and presented in an outline fashion under headings of physiologic and pathologic causes. Immediately following this brief is offered the differential points by history, physical examination, pelvic observations and laboratory findings. The treatment of vaginal trichomoniasis is abstracted and the treatment of gonorrhea infection is not quite up to date. In particular there is insufficient emphasis on the use and interpretation of cultures in gonococcic infections. The use of sulfonamides is slightly indefinite, and comments on penicillin are extremely brief and inconclusive. The author gives ample discussions on dyspareunia, frigidity and passion and the sociomedical problems in gynecology. Under the latter heading illegitimacy, abortion, sterilization and contraception are included, with expressions of his views. The discussion on the preparation for marriage and marital maladjustments is straightforward and practical. Throughout the book the history and physical findings and diagnosis stand out. The author adhered to his aims for this publication, as mentioned in the preface, (1) to aid the medical student in correlating the didactic lectures with the experience obtained in the gynecologic clinic and (2) to provide refresher material for the general practitioner. This publication is essentially a diagnostic gynecology, as less attention is given to the therapy. The weaker points can be easily corrected in the next edition. The many good qualities are immediately evident. However, the book will be valuable to both the medical student and the general practitioner, particularly from a diagnostic point of view. The publishers have done remarkably well. Both the author and the publishers can be appropriately complimented.

Studies of Burns and Scalds. (Reports of the Burns Unit, Royal Infirmary, Glasgow, 1942-43.) By L. Colebrook and others. Medical Research Council Special Report Series No. 249. Boards. Price, 4s. Pp. 210, with 50 illustrations. London: His Majesty's Stationery Office, 1944.

This small monograph contains a tremendous amount of clinical information about thermal injuries treated at the Glasgow Royal Infirmary during the years 1942 and 1943. About 400 patients admitted to the hospital are represented; 127 cases are summarized and 30 described in detail. Of the 127 cases, 37 were fatal. Six of them were burns involving 20 per cent of the body or under; in 15 of the fatal cases the burns were of 50 per cent or more of the body surface and death occurred within two days. All were treated locally by gentle débridement and cleansing with a detergent and dressed with a cream containing sulfonamide. Anesthesia was not necessary for this procedure; morphine was used as a routine and proved adequate.

Dr. Robert Cruickshank at the Royal Infirmary at Glasgow showed in 1935 that many infections in burns are caused by hemolytic streptococci, which are contaminants and reach the damaged area within a few days after admission to the hospital. These organisms were demonstrated in the air and on the floor of the wards in which the patients were treated. The obvious inference from this important study was the employment of painstaking aseptic technic, with special emphasis on careful avoidance of contamination once the patient enters the hospital. In other words, these studies applied to burns the basic principles of aseptic surgery.

By maintaining a rigid aseptic technic it was possible to demonstrate convincingly a substantial reduction in the incidence of infection. For example, in a series of 282 cases treated with such precautions only 20 passed through an acute suppurative phase due to streptococcic infection, none of which showed any evidence of spreading cellulitis. In another group of 119 patients treated locally with sulfonamide cream, daily temperatures were averaged and charted for a period of twenty-nine days. Half were treated before and the other half after the drive against contamination and cross infection had been instituted. The difference in the two groups was striking. In the group treated aseptically a temperature elevation above 99 F. occurred only on the second day, whereas in the control group the temperature did not drop below 99 F. until the eighth day. Moreover, the level of temperature was consistently lower for the rest of the period in the group handled with careful aseptic precautions. This program to eliminate contamination required painstaking attention to detail, masking of the patient and the personnel, and the education of nurses and attendants. Extending the bandage well beyond the burned area and firmly applying it to the normal skin were also important and prevented the entrance of infection from the outside by the dirty fingers of the patient. The authors also ascribe a definite bactericidal effect to the use of local sulfonamide therapy, which, they admit however is based on a strong impression rather than on any actual objective evidence. Sulfonamides were not used by mouth or by injection.

An interesting and important experiment was carried out on 4 patients who were given intravenous injections of a green dye to determine the extent of the increased capillary permeability. In at least 1 case the center and therefore the more severely burned area remained unstained by the dye. This obviously indicated a type of burn which had destroyed the circulation through the skin and was therefore associated with less extravasation. This observation perhaps was not sufficiently emphasized. It has an important bearing on the general assumption that the amount of fluid lost in a burn and therefore the amount required to correct hemoconcentration varies roughly with the extent of the burn. It seems clear that this would apply only if the entire burned area was associated with extravasation. This would be more likely when the thermal injury did not coagulate the skin, e. g. in scalds. Flame burns, on the other hand, might destroy the circulation through the injured area and thus limit the degree of exudation. Such differences may explain some of the discrepancies between the degree of hemoconcentration and the extent of the burn which the authors noted. These considerations emphasize the need for describing the type of burn present in each case. The title of the monograph "Burns and Scalds" suggested that the cases would be so classified, but this promise was not fulfilled. It might have been profitable to compare the degree of hemoconcentration with the kind of thermal injury (i. e. scald or burn) as well as with its extent. An instructive series of photographs showed the rapidity with which edema of the face subsides spontaneously after a superficial burn. Twenty-four hours after the injury the patient's facial edema, which nine hours before prevented the eyes from opening, had almost completely subsided.

Intravenous injections were carried out rather extensively, the fluid being largely serum or plasma. In some cases concentrated serum was used. The amounts injected were large and by present standards might be called excessive. The indications for the use of intravenous fluids was at first based on the development of hemoconcentration or other evidence of need. Soon this plan was changed to one in which plasma or serum was given early and more or less as a routine in order to prevent hemoconcentration. The latter plan was said to be justified by the results, which, however, on analysis seemed equivocal. Indeed, the authors admit that in at least 1 case there was an excessive amount of intravenous fluid. For example, a 6 year old child with a burn involving but 10 per cent of the body was given intravenously 1,900 cc. (about 75 cc. per kilogram) of plasma during six hours.

Fairly complete studies were made of the degree of hemoconcentration and an attempt was made to correlate this finding with the severity of the burn. While in general the extreme degrees of hemoconcentration were found only in the more severe burns, there were many cases in which the changes in relatively mild burns greatly surpassed those found with more extensive burns. Moreover, hemoconcentration was not infrequently slight or absent in severe burns. Explanation is not offered for this discrepancy, which of course has commonly been observed by many others. Obviously, as pointed out by the authors, factors other than the extent of injury are responsible for hemoconcentration and with it evidence of dehydration

and shock. One of these factors might well be the type of burn actually produced. As indicated, a dry, hard necrosis as produced by flame might involve less loss of plasma and less hemoconcentration than the extensive inflammation resulting from a scald.

Although hemoconcentration was present early in the burn, anemia was observed later, but only in the more serious cases. Red blood cell levels about 50 per cent of normal were reached in practically all of the most extensive burns on the tenth to the fourteenth day. In an attempt to explain this anemia, studies were made of the fragility of the red cells. Significant alterations were observed in the response of the red cells in burn patients as compared with the fragility of the red cells in normal subjects subjected to the same test. Moreover, many patients showed gross hemolysis in their circulating blood and a few contained hemoglobin in the urine. All patients showing hemolysis in the plasma in large amounts were extensively and severely burned, and all except 1 died within twelve hours of injury.

Chemical studies were carried out on many of these burned patients. Following are a few of the general conclusions: There was a rise in blood urea and nonprotein nitrogen in most cases in conformity with the observations of others. The total nitrogen excretion in the urine was fairly large in 1 or 2 cases but did not exceed 17 Gm. per day, which is somewhat less than the findings of others. As the authors state, this may have been due to a small intake of food, particularly by female patients. A fall in the level of plasma protein was observed even though large amounts of serum were given intravenously. Undoubtedly this was due to a loss of protein from the burned surfaces. This was suggested by the fact that the most rapid fall in plasma protein was seen in a case in which exudation was excessive. A striking feature of all burns aside from the very minor ones was the early rise in serum bilirubin. However, the rise was small, and clinical jaundice was never seen early and only once as a terminal event. There was an increased excretion of urobilinogen in 2 cases, which was taken as evidence of disturbance of hepatic function, although it could have been due to increased hemolysis. A transient rise in blood sugar was observed in a few cases during the early hours after the burn.

Postmortem findings are recorded in 30 fatal cases, and these may be summarized in general as being relatively meager, particularly in cases in which death occurred early after the burn. Aside from some edema and congestion in the brain and the occurrence of punctate hemorrhages in various organs and of catarrhal changes in the renal epithelium, little of significance was made out.

This extremely valuable and detailed study will be scrutinized with great interest by all those devoted to the various problems which are still unsolved in the treatment of this distressing injury. It should be read with profit by all who would control the incidence of infection in burns by simple but careful attention to aseptic surgical technic. It will provoke many questions and stimulate further study of the intravenous use of serum and plasma.

Woman's Medical Problems. By Maxine Davis. Cloth. Price, $2. Pp. 220. New York & London: Whittlesey House, McGraw-Hill Book Company, Inc., 1945.

This book was written by a woman reporter of medical news. She is not a physician, nor most likely is she a nurse. Nevertheless the publishers state that "this fine book sets forth in clear and understandable language but with complete authority all that medical science knows about the biologic functions of woman and the condition of disease or misfunctioning that may affect them."

Miss Davis writes "In the course of my many years of writing medical articles in magazines I have received tens of thousands of letters from suffering people from one end of this country to the other. Each month each fresh article brings in hundreds of letters. Ninety-nine per cent of the letters describe symptoms and ask me to recommend treatment or else they ask me to diagnose their illness and tell them what to suggest to the doctor" (page 4). This is a sad commentary on medicine. Authorities in the various fields of medicine should educate the public.

In the chapter on abortion the author dramatizes a story about a woman who wants an illegal abortion performed and must go to a disreputable and shabby physician. She then contrasts this with the recital of how abortions are done by high class abortionists, and this is based on a "description of one the author has seen" (page 56). After women read this ideal way of having a criminal abortion performed the author will indeed be deluged with letters asking for the name of the skilled abortionist whose office and technic she so vividly described.

The author says "a breech presentation means that labor is a little longer for you, but that is all; there is no greater likelihood of complications than in a head presentation" (page 50). Perhaps an increased fetal death rate is not important in the opinion of the author.

In describing cesarean section the author says "Under ideal conditions the risk of dying in a caesarian [sic] birth is only about 2.5 in a thousand" (page 82). Then on page 84 she says "You can see by the very low death rate, which in the case of many good obstetricians sinks to 1.5 per cent, that there is now no more danger in a caesarian section than in any other type of abdominal operation"! In the hands of skilled obstetricians the death rate for cesarean section is less than 1.5 per cent. However, the mortality for cesarean section in the hands of general surgeons and general practitioners is much, much higher than it is for nonobstetric laparotomies.

The author repeatedly quotes a few gynecologists such as Emil Novak and Alan Guttmacher, each of whom has written an excellent book on most of the subjects Miss Davis discusses.

Supervoltage X-Ray Therapy: A Report for the Years 1937-1942 on The Mozelle Sassoon Supervoltage X-Ray Therapy Department, St. Bartholomew's Hospital. By Ralph Phillips, M.S., M.B., F.R.C.S., Sir Halley Stewart Fellow. With the technical assistance of G. S. Innes, B.Sc., A.M.I.E.E., Physicist to the Mozelle Sassoon Department. With a foreword by The Rt. Hon. The Lord Horder, G.C.V.O., M.D., F.R.C.P. Cloth. Price, 16s. Pp. 141, with 95 illustrations. London: Published for the Sir Halley Stewart Trust by H. K. Lewis & Co., Ltd., 1944.

The x-ray department of St. Bartholomew's Hospital, London, under the direction of Dr. N. S. Finzi, presents in this report a summary of the work on supervoltage x-ray therapy for the five years ended in 1942. After this five year trial with a million volt x-ray equipment the author presents this interim report with the hope that the information contained will be helpful to others planning the establishment of radiotherapeutic centers.

A critical assessment of its value is not yet possible, but certain observations are made available, so that this work is a veritable mine of information regarding the technical installation and management of supervoltage x-ray equipment.

The investigation on cancer x-ray therapy really began in 1924 and was limited to carcinoma of the breast, locally inoperable and unsuitable for interstitial radium needling but without distant metastases; carcinoma of the uterus in all stages of the disease; cancer of the upper air and food passages unsuitable for surgery or interstitial radium needling; carcinoma of the rectum, similarly limited, and all cases of carcinoma of the esophagus.

In reviewing the results there does appear to be some advantage in the use of 1,000 volts as compared with 200 kilovolts. It is obvious that the clinical result of radiotherapy of malignant disease does not depend altogether on the wavelength of the radiation employed. If the clinical results depend to a large extent on the physical dose of radiation absorbed in a tumor, then supervoltage x-rays should prove superior to deep x-rays in the treatment of deep-seated tumors of limited extent. It has long been recognized that different types of cancer require different radiation technics for optimum results. Certain differences in favor of supervoltage have been found in the treatment of certain carcinomas, such as maxillary and breast tumors. The unpleasant by-effects of nausea and vomiting and anorexia which sometimes accompany x-ray therapy have been somewhat less noticeable with supervoltage than with 200 kilovolt x-ray treatment. A similar slight advantage relates to the changes produced in the blood picture, intensity of skin reaction and time of healing of tissue reactions.

In short, the author concludes that the results of this investigation permit the definite statement that supervoltage x-ray therapy is superior to deep x-ray therapy (200 kilovolt) in the treatment of certain types of malignant disease.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

PROPHYLAXIS AND TREATMENT OF WHOOPING COUGH

To the Editor:—What is the present status of the pertussis vaccines as a prophylactic and in the treatment of pertussis? I refer to the ordinary stock vaccines. The literature concerning the value of pertussis vaccination is confusing: the manufacturers continue to laud them highly. What are the Sauer and Kendrick vaccines? How do they differ from other types? What is the minimum age for the administration of pertussis vaccines?

T. E. Brewer, M.D., Mount Vernon, Ark.

ANSWER.—The present status of pertussis vaccine as a prophylactic or immunizing agent is authoritatively reviewed by Felton and Willard in a Report of the Council on Pharmacy and Chemistry (Current Status of Prophylaxis by Hemophilus Pertussis Vaccine, THE JOURNAL, Sept. 30, 1944, p. 294). It is now the consensus that phase I pertussis vaccine of the proper concentration and dosage will confer prolonged active immunity to children if the vaccine has been kept properly refrigerated and if injection is begun after the sixth month of life. The three doses are given subcutaneously in alternate arms, preferably at monthly intervals. In treatment, vaccine is useless or of questionable value chiefly perhaps because a time interval of at least several weeks must elapse after the final dose before an adequate concentration of specific antibodies has developed. Patients recover because the infecting bacilli stimulate the body to specific antibody production. Intimately exposed but not yet immunized infants and infants already infected should be injected promptly with hyperimmune human serum as prepared by the Philadelphia Serum Exchange (Children's Hospital of Philadelphia). It yields encouraging results when an adequate dose is injected. (Felton, Harriet M.: The Status of Passive Immunization and Treatment in Pertussis, THE JOURNAL, May 5, 1945, p. 26).

A chief difference between Sauer Hemophilus Pertussis Vaccine and that of the Kendrick type is that Sauer vaccine is prepared from bacilli grown on culture medium made with human blood. It is not "washed" and will not sensitize when injected. Northwestern University Medical School authorized Parke, Davis & Co. to market it. Because the Kendrick type of vaccine is prepared from bacilli grown on culture medium made with animal blood, it is necessary to "wash" the harvest to eliminate the alien protein, which might otherwise sensitize when injected. It is prepared at the Michigan State Department of Health and is marketed by several biologic laboratories. Pertussis vaccine made from old stock cultures are inert and should not be used. Sako, Treuting, Witt and Nichamin (Early Immunization Against Pertussis with Alum Precipitated Vaccine, THE JOURNAL, Feb. 17, 1945, p. 379) injected younger infants with three doses of alum precipitated pertussis vaccine. Although pertussis occurred in an appreciable percentage of the children injected so early in life, none who subsequently developed the disease died.

In recent years the use of a mixture of pertussis vaccine and diphtheria toxoid has increased. The infant, however, should be at least 6 or 7 months old before the first dose is given. The alum precipitated mixture yields the best results when the three doses are injected at monthly or bimonthly intervals. Alum abscess can be prevented by the proper injection technic. Such dual immunizations are based on well established laboratory and clinical evidence of effective protection. A five year summary has been published by Sauer, Tucker and Markley (Immunity Responses to Mixtures of Diphtheria Toxoid and Pertussis Vaccine, THE JOURNAL, Aug. 5, 1944, p. 949), who concluded that "infants can be immunized successfully against the two diseases at the same time."

STIFF JOINT AFTER OPERATION ON LIGAMENTS

To the Editor:—In what percentage of patients does a stiff joint result after operation for torn ligaments of the knee joint?

Benjamin Berger, M.D., New York.

ANSWER.—A stiff joint after an operation for torn ligaments of the knee joint should occur only seldom. One reason for a stiff knee following this operation would be an infection which caused a destruction of the joint surfaces, resulting in either a fibrous union or a bony ankylosis between the joint surfaces. There are no figures that would answer the question raised. All one can say is that if a stiff joint follows an operation on the knee it must be due to an infection or a chronic inflammatory joint disease.

COLMETANESE FOR UNDULANT FEVER

To the Editor:—A woman aged 40 is suffering from undulant fever. The agglutination test showed complete agglutination in serum dilutions of 1:20 to 1:40 and partial agglutination at 1:80. The infection apparently was contracted about six years ago. She has had typhoid injections, liver and iron for her secondary anemia and general supportive treatments. The typhoid injections were given about two years ago by a doctor in Texas and I do not know about the results. The patient brought in an ampule of Colmetanese. It is made by Farnsworth Laboratories in Chicago. A doctor in Texas gave her four ampules intravenously, two per week, and these injections together with vitamin B_1 caused a drastic improvement in the patient's condition. She also brought in an article written by O. W. Schreiner, M.D., medical director, Wilson & Co., Chicago, entitled "Brucellosis—A Preliminary Report of Cases Treated with Radioactive Colloidal Manganese." I discussed the matter with a pathologist who had no knowledge of this substance but who advised extreme caution in the use of heavy metals and radioactive substances. What is known concerning this preparation?

M.D., California.

ANSWER.—No preparation of the Farnsworth Laboratories stands accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies, and the Council has made no investigation of Colmetanese, which was formerly called Colmanganese. Colmetanese is claimed to be a combination of manganese and radium in colloidal form. According to the promoters "the metal (manganese) is used in an extremely finely dispersed colloidal form, in conjunction with a special ionizing principle so introduced as to give Colmetanese the equivalent of 0.01875 microgram of radium chloride per 10 cc. of solution, and it is the combination of these materials (in the same vehicle) which is responsible for the results described later."

The use of Colmetanese has been proposed for intravenous, intramuscular or rectal administration for a wide variety of disorders including streptococcic and staphylococcic infections, chronic prostatitis, gastric and duodenal ulcers, arthritis, chronic otitis media, mastoiditis, purulent sinusitis, postpartum septicemia, osteomyelitis and pyonephritis, as well as undulant fever. Although strong claims have been advanced for the therapeutic value of Colmetanese, these do not appear to be supported by anything more substantial than a number of uncritical testimonials which cannot be accepted as scientific evidence of the therapeutic worth of the preparation. Colmanganese, now called Colmetanese, has been advertised in connection with the Farnsworth Laboratories' "Alphacatalyst," which is a more recent name for the treatment that was formerly called "Oxycatalyst." This was originally promoted as a cancer cure and was discussed in THE JOURNAL, May 19, 1928. This background information on Colmetanese together with the unusual course of undulant fever, which makes it impossible to give a fair appraisal of any therapeutic agent on a few cases and over a short period of time, does not lead to the development of any confidence whatever in the use of Colmetanese in the treatment of brucellosis.

CUTANEOUS LESIONS AND GONORRHEA

To the Editor:—A man aged 45 has had tumors all over the surface of his body for about ten years. The condition has been diagnosed by skin specialists as von Recklinghausen's disease. His wife, to whom he has been married for fifteen years, acquired gonorrhea from her first husband. She had never been treated for the disease. The patient came to me for treatment of a discharge from the urethra; gram negative intracellular diplococci were found on examination. Treatment has consisted of 2 Gm. of sulfathiazole daily with the result that the discharge has changed from purulent to watery. But more interesting is the fact that the tumors have started to disappear; the skin of his face and neck is almost completely clear, and the other parts of the body are at least 50 per cent better. Is it known that sulfathiazole influences von Recklinghausen's disease?

Ernest Weiss, M.D., Westwood, Calif.

ANSWER.—If sulfathiazole has caused the disappearance of some of these tumors, the condition is not von Recklinghausen's disease. The tumors in von Recklinghausen's disease are new growths of connective tissue, and sulfathiazole would have no effect on them. The lesions of keratosis blennorrhagica, a cutaneous disorder which occurs in connection with gonorrhea, appear as isolated, sometimes confluent, hornlike yellowish brown crusts. However, these lesions occur only during an attack of acute gonorrhea and are accompanied by arthritis and other complications. They do not resemble in any possible manner the lesions seen in von Recklinghausen's disease.

ANURIA

To the Editor:—Would you please let me have the accepted method of treatment of anuria (1) after transfusion of large quantities of blood (5,000 cc.) and (2) after shock, postoperative. Major, M. C., A. U. S.

ANSWER.—The mechanisms of anuria in the instances cited may be the same or they may be of separate origin. 1. After the transfusion of large quantities of blood (5,000 cc.) anuria may result from the condition for which the blood was given, e. g. shock, or from some variety of transfusion reaction. Transfusion reactions may be of three types: that due to an error in performing the conventional crossmatching, that due to the existence of a subgroup such as Rh incompatibility when large amounts of blood or repeated transfusions are used or that due to the presence of isoagglutinins in plasma, serum or group O blood in sufficiently high titer to clump and hemolyze the recipient's cells. M. M. Strumia (*Pennsylvania M. J.* **47**:668 [April] 1944) lists four possible explanations for manifestations of anuria after post-transfusion hemolytic reactions: blockage of renal tubules, anaphylaxis or sensitization to anomalous agglutinogens such as the Rh factor, ischemia of the kidneys from vasoconstriction or nephrotoxic substances released from hemolysis. None of these theories explain all the occurrences, although there is considerable evidence for the theory of toxic nephrosis. Ayer and Kammer (Ayer, G. D., and Kammer, W. F.: *Arch. Int. Med.* **73**:199 [March] 1944) state that intragroup incompatibilities are produced by immune isoagglutinins that develop in the recipient. The factor responsible is usually Rh, and the intragroup transfusion reactions in male patients usually occur after repeated transfusions. The mechanism may be similar to that in crush injury in some instances (Bywaters, E. G. L.: THE JOURNAL, April 15, 1944, p. 1103).

Treatment is largely prophylactic. Careful attention to typing and cross matching and the use of test serums of high potency are essential. Transfusions should be given slowly. When repeated transfusions are done, Rh typing is advisable and, if repeated transfusions of group O blood are used, such blood should have a low titer. Such prophylactic measures are especially important since therapeutic measures are so ineffective. Strumia stated that, "to our knowledge, there is no therapeutic procedure which has proved uniformly successful in the treatment of renal damage following transfusions of incompatible blood. Alkalization, renal decapsulation or sympathectomy, renal pelvic lavage, blood and plasma transfusions and many other procedures have been advocated. In any event it seems logical to maintain an adequate fluid intake and blood volume." Specifically, alkalization can be accomplished by oral or parenteral administration of basic solutions. For prophylaxis, after an initial dose of 4 Gm., 2 Gm. of sodium bicarbonate should be given by mouth in water every three hours (18 Gm. a day). If sodium bicarbonate solution is used by mouth or by vein, 1,500 cc. of isotonic (one-sixth molar) sodium bicarbonate solution should be given daily in divided doses. If sodium lactate solution (one-sixth molar) is used, the dosages are identical. For therapeutic use with already developed anuria, these dosages may not be sufficient and can safely be tripled the first day and thereafter be reduced to the prophylactic dose. Other fluid should be given in addition to the alkaline solution, and in general for every unit of bicarbonate or lactate solution given, an equal quantity of isotonic solution of sodium chloride may be administered. The use of physiologic electrolyte solution (2 parts of isotonic solution of sodium chloride and 1 part of sixth-molar bicarbonate or lactate solution), as advised for burns, can be given by mouth or by vein for the purposes of alkalization. Such a solution in double or triple the prophylactic dose mentioned supplies the alkali and saline in a combined form.

2. After postoperative shock, anuria may develop as a result of the shock itself, from transfusion reactions or from the anesthesia. In postoperative shock a crush syndrome-like mechanism is seldom operative except in extremity cases when there has been a tourniquet on the extremity during operation or in instances of release of large segments of strangulated bowel. Most often the anuria results from a profound and continued fall in blood pressure with associated decreased renal flow. Such damage may be permanent or may be temporary. Injury to the kidneys by anesthetic agents either with or without prolonged blood pressure fall has been studied by Coller (Coller, F. G., and others: *Ann. Surg.* **118**:717 [Oct.] 1943).

Treatment consists in preventing and managing shock in the usually accepted ways by the administration of plasma, whole blood and adequate fluids and in using controlled anesthesia. Large doses of spinal anesthesia are especially dangerous in hypertensive patients. When anuria has already developed despite antishock measures, the methods of treatment listed in the previous section, alkalization and administration of fluids, can be tried but are not always successful.

ASTHMA AND TUBERCULOSIS

To the Editor:—A physician has had moderately severe bronchial asthma for eight years, presumably due to multiple allergens. Exhaustive diagnostic tests have failed to reveal any specific etiologic factor or factors. Inhalations of a solution of 1:100 epinephrine hydrochloride by nebulizer generally give a fair degree of relief. Use of epinephrine is necessary two to four times a week. This physician has contended that with this condition present it would be unwise for him to perform duties in a tuberculosis hospital. M.D., Ohio.

ANSWER.—From the description given it is fairly safe to assume that the case described is one of moderate rather than of severe asthma, since inhalation of a solution of 1:100 epinephrine gives a fair degree of relief and is not required more often than two to four times a week.

The literature is full of contradictions as to whether such an individual is more likely to develop tuberculosis than the average adult. However many of the older writers (Rokitansky, Bruegelman, Schroeder) were of the opinion that asthma and tuberculosis are seldom found together. More recent authors are inclined to the opinion that tuberculosis does not occur more frequently in patients with asthma than in persons suffering from other diseases. With the exercise of ordinary precautions the physician who has the degree of asthma indicated in this question should be able to work in a tuberculosis hospital with no more danger than if he did not have asthma.

EFFECT OF HEAT ON MUCOSA OF RECTUM AND COLON

To the Editor:—What work has been done on the effect of heat, as from a hot enema on the rectal and colon mucosa? Has there been any comparison made between a lesion so produced and that produced by chemical irritation? Is there any reference in the literature to the medicolegal implications? M.D., Pennsylvania.

ANSWER.—The medical literature is conspicuously devoid of contributions concerning the effect of heat on the mucosa of the rectum and colon. In the discussion of a paper by Ault dealing with perforation of the rectum with enema tips (Ault, G. W.: Perforation of Rectum with Enema Tips, *Tr. Am. Proct. Soc.* **40**:203, 1939 Murray briefly cites 1 case with fatal termination four days after administration of an enema "at too high a temperature." Death was attributed to shock and sepsis following intestinal burns. There has been no known reported comparison made between a lesion produced by the effect of heat and that produced by chemical irritation. There is no reference in the available textbooks on medical jurisprudence with respect to the medicolegal implications.

PENICILLIN AND PROCAINE HYDROCHLORIDE

To the Editor:—I have recently treated multiple furunculosis (boils) by infiltration with a solution of penicillin and procaine hydrochloride. The results were successful far beyond expectation. This solution was prepared by taking 1 cc. of penicillin solution, 20,000 units per cubic centimeter, in a sterile syringe and then drawing 1 cc. of 2 per cent procaine hydrochloride solution into the same syringe. The mixture was agitated a little and then infiltrated into the furuncle slowly. The amount of injection depended on the size of the furuncle and ranged from 0.1 to 0.5 cc. Thus the syringe contained enough for several furuncles. The furuncles healed rapidly and there was no after-pain as commonly found with straight penicillin. I have been wondering what effect procaine hydrochloride has on the stability or activity of penicillin when mixed together and used immediately as described. Alex J. Otten, M.D., Grand Forks, N. D.

ANSWER.—There is no evidence that mixing procaine hydrochloride has any deleterious effect on penicillin when it is mixed with it and used immediately as described. This method has been used frequently to avoid painful reactions when penicillin of low potency is injected intramuscularly.

POSSIBLE FROEHLICH'S SYNDROME

To the Editor:—The answer to the query on "Possible Froehlich's Syndrome" in The Journal, May 26, 1945, page 318, contains certain inaccuracies. In the first place, contrary to the statement made, gonadotropic hormones are capable of increasing the gonads and frequently also the genitalia and other sexual characteristics. Secondly, x-ray films of the skull detect mainly disturbances in the growth hormone fraction, which does not seem disturbed in this case. Abnormalities in the size of the sella are inconclusive in most cases, and absent or too small size of sinuses are not indicative of gonadotropic dysfunction per se. Thirdly, the basal metabolic rate will probably be normal and any possible small deviation will not be helpful in the diagnosis or plan of treatment. Of greater value would be a determination of the blood cholesterol and uric acid.

William Wolf, M.D., New York.